SEQUENCE LISTING

<110> DeAngelis, Paul
Jing, Wei

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Val Asn Val Cys Asp Ser Pro Leu Asp Ile Ala Thr Gln Leu Leu Leu
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Ser Asn Val Lys Lys Leu Val Leu Ser Asp Ser Glu Lys Asn Thr Leu
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Lys Asn Lys Trp Lys Leu Leu Thr Glu Lys Lys Ser Glu Asn Ala Glu
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Met Arg Glu Lys Val Pro Tyr Ile Tyr Arg Lys Leu Leu Pro Ile Glu
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Glu Asn Ala Val Asp Tyr Asp Met Phe Leu Lys Leu Ser Glu Val Gly
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Phe Val Lys Asn Asp Ser Tyr Ala Tyr Met Lys Lys Tyr Asp Val Gly
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Met Asn Phe Ser Ala Leu Thr His Asp Trp Ile Glu Lys Ile Asn Ala
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Trp Phe Gln Phe Ala Leu Leu Ile Leu Glu Lys Lys Thr Gly His Val
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Phe Asn Lys Thr Ser Thr Leu Thr Tyr Met Pro Trp Glu Arg Lys Leu
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Thr Gly Lys Lys Ser Glu Asn Ala Glu Ile Arg Lys Val Glu Leu Val
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Pro Lys Asp Phe Pro Lys Asp Leu Val Leu Ala Pro Leu Pro Asp His
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130 135 140

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Lys Thr Asn Tyr Pro Phe Glu Val Val Val Ala Asp Asp Gly Ser Lys
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Asp Ile Ser Tyr Tyr Thr Ser Asn Arg Leu Ile Lys Thr Glu Ala His
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Leu Ser Asn Ile Asn Lys Leu Ser Gln Leu Asn Leu Asn Cys Glu Tyr
785 790 795 800

Ile Ile Phe Asp Asn His Asp Ser Leu Phe Val Lys Asn Asp Ser Tyr
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Ala Tyr Met Lys Lys Tyr Asp Val Gly Met Asn Phe Ser Ala Leu Thr
820 825 830

His Asp Trp Ile Glu Lys Ile Asn Ala His Pro Pro Phe Lys Lys Leu
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Ile Lys Thr Tyr Phe Asn Asp Asn Asp Leu Arg Ser Met Asn Val Lys
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Gly Ala Ser Gln Gly Met Phe Met Lys Tyr Ala Leu Pro His Glu Leu
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Val Pro Glu Tyr Asn Thr Glu Asp Ile Trp Phe Gln Phe Ala Leu Leu
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Ile Leu Glu Lys Lys Thr Gly His Val Phe Asn Lys Thr Ser Thr Leu
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Thr Tyr Met Pro Trp Glu Arg Lys Leu Gln Trp Thr Asn Glu Gln Ile
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aataatataa agcaaaaaac ctctgatgct agacaaaatt atctccatga attccaaaaa 960

atacacaatg aaaggaaatt aaatgaatta aaagagattt ttagctttcc tagaattcat 1020

gacgccttac ctatatcaaa agaaatgagt aagctcagca accctaaaat tcctgtttat 1080

ataaatatat gctcaatacc ttcaagaata aaacaacttc aatacactat tggagtacta 1140

aaaaaccaat gcgatcattt tcatatttat cttgatggat atccagaagt acctgatttt 1200

ataaaaaaac tagggaataa agcgaccgtt attaattgtc aaaacaaaaa tgagtctatt 1260

agagataatg gaaagtttat tctattagaa aaacttataa aggaaaataa agatggatat 1320

tatataactt gtgatgatga tatccggtat cctgctgact acacaaacac tatgataaaa 1380

aaaattaata aatacaatga taaagcagca attggattac atggtgttat attcccaagt 1440

agagtcaaca agtatttttc atcagacaga attgtctata attttcaaaa acctttagaa 1500

aatgatactg ctgtaaatat attaggaact ggaactgttg cctttagagt atctattttt 1560

aataaatttt ctctatctga ttttgagcat cctggcatgg tagatatcta tttttctata 1620

ctatgtaaga aaaacaatat actccaagtt tgtatatcac gaccatcgaa ttggctaaca 1680

gaagataaca aaaacactga gaccttattt catgaattcc aaaatagaga tgaaatacaa 1740

agtaaactca ttatttcaaa caacccttgg ggatactcaa gtatatatcc actattaaat 1800

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<210> 6
<211> 615
<212> PRT
<213> Pasteurella multocida

<400> 6

Met Ser Leu Phe Lys Arg Ala Thr Glu Leu Phe Lys Ser Gly Asn Tyr
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Lys Asp Ala Leu Thr Leu Tyr Glu Asn Ile Ala Lys Ile Tyr Gly Ser
20 25 30

Glu Ser Leu Val Lys Tyr Asn Ile Asp Ile Cys Lys Lys Asn Ile Thr
35 40 45

Gln Ser Lys Ser Asn Lys Ile Glu Glu Asp Asn Ile Ser Gly Glu Asn
50 55 60

Lys Phe Ser Val Ser Ile Lys Asp Leu Tyr Asn Glu Ile Ser Asn Ser
65 70 75 80

Glu Leu Gly Ile Thr Lys Glu Arg Leu Gly Ala Pro Pro Leu Val Ser
85 90 95

Ile Ile Met Thr Ser His Asn Thr Glu Lys Phe Ile Glu Ala Ser Ile
100 105 110

Asn Ser Leu Leu Leu Gln Thr Tyr Asn Leu Glu Val Ile Val Val Asp
115 120 125

Asp Tyr Ser Thr Asp Lys Thr Phe Gln Ile Ala Ser Arg Ile Ala Asn
130 135 140

Ser Thr Ser Lys Val Lys Thr Phe Arg Leu Asn Ser Asn Leu Gly Thr
145 150 155 160

Tyr Phe Ala Lys Asn Thr Gly Ile Leu Lys Ser Lys Gly Asp Ile Ile
165 170 175

Phe Phe Gln Ser Asp Asp Val Cys His His Glu Arg Ile Glu Arg Cys
180 185 190

Val Asn Ala Leu Leu Ser Asn Lys Asp Asn Ile Ala Val Arg Cys Ala
195 200 205

Tyr Ser Arg Ile Asn Leu Glu Thr Gln Asn Ile Ile Lys Val Asn Asp

210 215 220

Asn Lys Tyr Lys Leu Gly Leu Ile Thr Leu Gly Val Tyr Arg Lys Val
225 230 235 240

Phe Asn Glu Ile Gly Phe Phe Asn Cys Thr Thr Lys Ala Ser Asp Asp
245 250 255

Glu Phe Tyr His Arg Ile Ile Lys Tyr Tyr Gly Lys Asn Arg Ile Asn
260 265 270

Asn Leu Phe Leu Pro Leu Tyr Tyr Asn Thr Met Arg Glu Asp Ser Leu
275 280 285

Phe Ser Asp Met Val Glu Trp Val Asp Glu Asn Asn Ile Lys Gln Lys
290 295 300

Thr Ser Asp Ala Arg Gln Asn Tyr Leu His Glu Phe Gln Lys Ile His
305 310 315 320

Asn Glu Arg Lys Leu Asn Glu Leu Lys Glu Ile Phe Ser Phe Pro Arg
325 330 335

Ile His Asp Ala Leu Pro Ile Ser Lys Glu Met Ser Lys Leu Ser Asn
340 345 350

Pro Lys Ile Pro Val Tyr Ile Asn Ile Cys Ser Ile Pro Ser Arg Ile
355 360 365

Lys Gln Leu Gln Tyr Thr Ile Gly Val Leu Lys Asn Gln Cys Asp His
370 375 380

Phe His Ile Tyr Leu Asp Gly Tyr Pro Glu Val Pro Asp Phe Ile Lys
385 390 395 400

Lys Leu Gly Asn Lys Ala Thr Val Ile Asn Cys Gln Asn Lys Asn Glu
405 410 415

Ser Ile Arg Asp Asn Gly Lys Phe Ile Leu Leu Glu Lys Leu Ile Lys
420 425 430

Glu Asn Lys Asp Gly Tyr Tyr Ile Thr Cys Asp Asp Asp Ile Arg Tyr
435 440 445

Pro Ala Asp Tyr Thr Asn Thr Met Ile Lys Lys Ile Asn Lys Tyr Asn
450 455 460

Asp Lys Ala Ala Ile Gly Leu His Gly Val Ile Phe Pro Ser Arg Val

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465                 470                 475                 480

Asn Lys Tyr Phe Ser Ser Asp Arg Ile Val Tyr Asn Phe Gln Lys Pro
                485                 490                 495

Leu Glu Asn Asp Thr Ala Val Asn Ile Leu Gly Thr Gly Thr Val Ala
            500                 505                 510

Phe Arg Val Ser Ile Phe Asn Lys Phe Ser Leu Ser Asp Phe Glu His
        515                 520                 525

Pro Gly Met Val Asp Ile Tyr Phe Ser Ile Leu Cys Lys Lys Asn Asn
    530                 535                 540

Ile Leu Gln Val Cys Ile Ser Arg Pro Ser Asn Trp Leu Thr Glu Asp
545                 550                 555                 560

Asn Lys Asn Thr Glu Thr Leu Phe His Glu Phe Gln Asn Arg Asp Glu
                565                 570                 575

Ile Gln Ser Lys Leu Ile Ile Ser Asn Asn Pro Trp Gly Tyr Ser Ser
            580                 585                 590

Ile Tyr Pro Leu Leu Asn Asn Asn Ala Asn Tyr Ser Glu Leu Ile Pro
        595                 600                 605

Cys Leu Ser Phe Tyr Asn Glu
    610                 615
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<210> 7
<211> 1940
<212> DNA
<213> Pasteurella multocida

<400> 7

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gatgatagag tgtttcgctg tctctattat cttccgttag ccagtttgct ggtcttgaaa    180

tacaaatctg aagaatatta tttttcttac acaagagaga gaaatagata tcagccatgc    240

ctgaatgggt aaagtcagaa agagaaaatt gattaaagag actgactcta aagctaacag    300

ttcctgtacc taatacattg accgctttgt ctttttccag aggtttatag aagctatata    360

ccagtctatc cgccgaaaaa tatttggtca ttctacttgg aaagagaatg ccgtgtaaac    420

caataaccgc tttatcatcg tattcattca gcttcttgat catcgtattg atgtaatcgc    480

ttggatagat aatgtcatca tcacaggtta tataatatcc atcttgattt ttttcaatca    540

actcttccag taaaatgaat ttgccattat ctctaatgga gttatcttta tctttgcaat    600
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gaacaacggt tgctttatta cctaaatttt ttatgaagtc agggatttct acatagccat 660

caagataaat atgaaaatga tcacattgat tttttagtat gccgataata cgtcgtaatt 720

gcgctattct tgagggaata gaacaaatat tgatataaac aggaatctta ggattggaca 780

acttactcat ttcttgtggt actggtaagg catcgtaaat acgagggaat tgaaaaagat 840

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ctattctttc atgatgacat acatcatcac tatcttgaaa gaaaataatg tcacctttag 1320

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tatcatcatc tacaataata atttctatgt ttttatatgt ttgtaacaat aatgaattaa 1500

tagaagcttc gataaattgc gctgtattgt gagatgtcat gataatactg actaatggat 1560

ttacgctgtt ggtttctttg actaacccta aatcactttt agcgacttca ttatataaat 1620

ctgttattga tgttgtttgc ttatcttttt ctagctttgc ttctaatgct tgattatagg 1680

tatatatttt ttcaaattct tgcagaacca attggagttg ttttaataaa agtttatttt 1740

cgttttcaag ggatgcggat agcggatgtt tactgtcctg ttttgccaat aaagtttgtt 1800

gagaaataat gtctttgttt aaagttgttt ttagactatc aattttattt tgaaaggtgt 1860

tgagttcatt ttctttttca tgttgggggg gatttttagt catttgtttt tgagtcatct 1920

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<210> 8
<211> 651
<212> PRT
<213> Pasteurella multocida

<400> 8

Met Lys Arg Lys Lys Glu Met Thr Gln Lys Gln Met Thr Lys Asn Pro
1 5 10 15

Pro Gln His Glu Lys Glu Asn Glu Leu Asn Thr Phe Gln Asn Lys Ile
20 25 30

Asp Ser Leu Lys Thr Thr Leu Asn Lys Asp Ile Ile Ser Gln Gln Thr

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        35                  40                  45

Leu Leu Ala Lys Gln Asp Ser Lys His Pro Leu Ser Ala Ser Leu Glu
    50                  55                  60

Asn Glu Asn Lys Leu Leu Leu Lys Gln Leu Gln Leu Val Leu Gln Glu
65                  70                  75                  80

Phe Glu Lys Ile Tyr Thr Tyr Asn Gln Ala Leu Glu Ala Lys Leu Glu
                85                  90                  95

Lys Asp Lys Gln Thr Thr Ser Ile Thr Asp Leu Tyr Asn Glu Val Ala
            100                 105                 110

Lys Ser Asp Leu Gly Leu Val Lys Glu Thr Asn Ser Val Asn Pro Leu
        115                 120                 125

Val Ser Ile Ile Met Thr Ser His Asn Thr Ala Gln Phe Ile Glu Ala
    130                 135                 140

Ser Ile Asn Ser Leu Leu Leu Gln Thr Tyr Lys Asn Ile Glu Ile Ile
145                 150                 155                 160

Ile Val Asp Asp Asp Ser Ser Asp Asn Thr Phe Glu Ile Ala Ser Arg
                165                 170                 175

Ile Ala Asn Thr Thr Ser Lys Val Arg Val Phe Arg Leu Asn Ser Asn
            180                 185                 190

Leu Gly Thr Tyr Phe Ala Lys Asn Thr Gly Ile Leu Lys Ser Lys Gly
        195                 200                 205

Asp Ile Ile Phe Phe Gln Asp Ser Asp Asp Val Cys His His Glu Arg
    210                 215                 220

Ile Glu Arg Cys Val Asn Ile Leu Leu Ala Asn Lys Glu Thr Ile Ala
225                 230                 235                 240

Val Arg Cys Ala Tyr Ser Arg Leu Ala Pro Glu Thr Gln His Ile Ile
                245                 250                 255

Lys Val Asn Asn Met Asp Tyr Arg Leu Gly Phe Ile Thr Leu Gly Met
            260                 265                 270

His Arg Lys Val Phe Gln Glu Ile Gly Phe Phe Asn Cys Thr Thr Lys
        275                 280                 285

Gly Ser Asp Asp Glu Phe Phe His Arg Ile Ala Lys Tyr Tyr Gly Lys
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290 295 300

Glu Lys Ile Lys Asn Leu Leu Leu Pro Leu Tyr Tyr Asn Thr Met Arg
305 310 315 320

Glu Asn Ser Leu Phe Thr Asp Met Val Glu Trp Ile Asp Asn His Asn
325 330 335

Ile Ile Gln Lys Met Ser Asp Thr Arg Gln His Tyr Ala Thr Leu Phe
340 345 350

Gln Ala Met His Asn Glu Thr Ala Ser His Asp Phe Lys Asn Leu Phe
355 360 365

Gln Phe Pro Arg Ile Tyr Asp Ala Leu Pro Val Pro Gln Glu Met Ser
370 375 380

Lys Leu Ser Asn Pro Lys Ile Pro Val Tyr Ile Asn Ile Cys Ser Ile
385 390 395 400

Pro Ser Arg Ile Ala Gln Leu Arg Arg Ile Ile Gly Ile Leu Lys Asn
405 410 415

Gln Cys Asp His Phe His Ile Tyr Leu Asp Gly Tyr Val Glu Ile Pro
420 425 430

Asp Phe Ile Lys Asn Leu Gly Asn Lys Ala Thr Val Val His Cys Lys
435 440 445

Asp Lys Asp Asn Ser Ile Arg Asp Asn Gly Lys Phe Ile Leu Leu Glu
450 455 460

Glu Leu Ile Glu Lys Asn Gln Asp Gly Tyr Tyr Ile Thr Cys Asp Asp
465 470 475 480

Asp Ile Ile Tyr Pro Ser Asp Tyr Ile Asn Thr Met Ile Lys Lys Leu
485 490 495

Asn Glu Tyr Asp Asp Lys Ala Val Ile Gly Leu His Gly Ile Leu Phe
500 505 510

Pro Ser Arg Met Thr Lys Tyr Phe Ser Ala Asp Arg Leu Val Tyr Ser
515 520 525

Phe Tyr Lys Pro Leu Glu Lys Asp Lys Ala Val Asn Val Leu Gly Thr
530 535 540

Gly Thr Val Ser Phe Arg Val Ser Leu Phe Asn Gln Phe Ser Leu Ser

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545                 550                 555                 560

Asp Phe Thr His Ser Gly Met Ala Asp Ile Tyr Phe Ser Leu Leu Cys
                565                 570                 575

Lys Lys Asn Asn Ile Leu Gln Ile Cys Ile Ser Arg Pro Ala Asn Trp
            580                 585                 590

Leu Thr Glu Asp Asn Arg Asp Ser Glu Thr Leu Tyr His Gln Tyr Arg
        595                 600                 605

Asp Asn Asp Glu Gln Gln Thr Gln Leu Ile Met Glu Asn Gly Pro Trp
    610                 615                 620

Gly Tyr Ser Ser Ile Tyr Pro Leu Val Lys Asn His Pro Lys Phe Thr
625                 630                 635                 640

Asp Leu Ile Pro Cys Leu Pro Phe Tyr Phe Leu
                645                 650
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<210> 9
<211> 703
<212> PRT
<213> Pasteurella multocida

<400> 9

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Met Asn Thr Leu Ser Gln Ala Ile Lys Ala Tyr Asn Ser Asn Asp Tyr
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Gln Leu Ala Leu Lys Leu Phe Glu Lys Ser Ala Glu Ile Tyr Gly Arg
            20                  25                  30

Lys Ile Val Glu Phe Gln Ile Thr Lys Cys Lys Glu Lys Leu Ser Ala
        35                  40                  45

His Pro Ser Val Asn Ser Ala His Leu Ser Val Asn Lys Glu Glu Lys
    50                  55                  60

Val Asn Val Cys Asp Ser Pro Leu Asp Ile Ala Thr Gln Leu Leu Leu
65                  70                  75                  80

Ser Asn Val Lys Lys Leu Val Leu Ser Asp Ser Glu Lys Asn Thr Leu
                85                  90                  95

Lys Asn Lys Trp Lys Leu Leu Thr Glu Lys Lys Ser Glu Asn Ala Glu
            100                 105                 110

Val Arg Ala Val Ala Leu Val Pro Lys Asp Phe Pro Lys Asp Leu Val
        115                 120                 125
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Leu Ala Pro Leu Pro Asp His Val Asn Asp Phe Thr Trp Tyr Lys Lys
    130                 135                 140

Arg Lys Lys Arg Leu Gly Ile Lys Pro Glu His Gln His Val Gly Leu
145                 150                 155                 160

Ser Ile Ile Val Thr Thr Phe Asn Arg Pro Ala Ile Leu Ser Ile Thr
                165                 170                 175

Leu Ala Cys Leu Val Asn Gln Lys Thr His Tyr Pro Phe Glu Val Ile
            180                 185                 190

Val Thr Asp Asp Gly Ser Gln Glu Asp Leu Ser Pro Ile Ile Arg Gln
        195                 200                 205

Tyr Glu Asn Lys Leu Asp Ile Arg Tyr Val Arg Gln Lys Asp Asn Gly
    210                 215                 220

Phe Gln Ala Ser Ala Ala Arg Asn Met Gly Leu Arg Leu Ala Lys Tyr
225                 230                 235                 240

Asp Phe Ile Gly Leu Leu Asp Cys Asp Met Ala Pro Asn Pro Leu Trp
                245                 250                 255

Val His Ser Tyr Val Ala Glu Leu Leu Glu Asp Asp Asp Leu Thr Ile
            260                 265                 270

Ile Gly Pro Arg Lys Tyr Ile Asp Thr Gln His Ile Asp Pro Lys Asp
        275                 280                 285

Phe Leu Asn Asn Ala Ser Leu Leu Glu Ser Leu Pro Glu Val Lys Thr
    290                 295                 300

Asn Asn Ser Val Ala Ala Lys Gly Glu Gly Thr Val Ser Leu Asp Trp
305                 310                 315                 320

Arg Leu Glu Gln Phe Glu Lys Thr Glu Asn Leu Arg Leu Ser Asp Ser
                325                 330                 335

Pro Phe Arg Phe Phe Ala Ala Gly Asn Val Ala Phe Ala Lys Lys Trp
            340                 345                 350

Leu Asn Lys Ser Gly Phe Phe Asp Glu Glu Phe Asn His Trp Gly Gly
        355                 360                 365

Glu Asp Val Glu Phe Gly Tyr Arg Leu Phe Arg Tyr Gly Ser Phe Phe
    370                 375                 380
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Lys Thr Ile Asp Gly Ile Met Ala Tyr His Gln Glu Pro Pro Gly Lys
385 390 395 400

Glu Asn Glu Thr Asp Arg Glu Ala Gly Lys Asn Ile Thr Leu Asp Ile
405 410 415

Met Arg Glu Lys Val Pro Tyr Ile Tyr Arg Lys Leu Leu Pro Ile Glu
420 425 430

Asp Ser His Ile Asn Arg Val Pro Leu Val Ser Ile Tyr Ile Pro Ala
435 440 445

Tyr Asn Cys Ala Asn Tyr Ile Gln Arg Cys Val Asp Ser Ala Leu Asn
450 455 460

Gln Thr Val Val Asp Leu Glu Val Cys Ile Cys Asn Asp Gly Ser Thr
465 470 475 480

Asp Asn Thr Leu Glu Val Ile Asn Lys Leu Tyr Gly Asn Asn Pro Arg
485 490 495

Val Arg Ile Met Ser Lys Pro Asn Gly Gly Ile Ala Ser Ala Ser Asn
500 505 510

Ala Ala Val Ser Phe Ala Lys Gly Tyr Tyr Ile Gly Gln Leu Asp Ser
515 520 525

Asp Asp Tyr Leu Glu Pro Asp Ala Val Glu Leu Cys Leu Lys Glu Phe
530 535 540

Leu Lys Asp Lys Thr Leu Ala Cys Val Tyr Thr Thr Asn Arg Asn Val
545 550 555 560

Asn Pro Asp Gly Ser Leu Ile Ala Asn Gly Tyr Asn Trp Pro Glu Phe
565 570 575

Ser Arg Glu Lys Leu Thr Thr Ala Met Ile Ala His His Phe Arg Met
580 585 590

Phe Thr Ile Arg Ala Trp His Leu Thr Asp Gly Phe Asn Glu Lys Ile
595 600 605

Glu Asn Ala Val Asp Tyr Asp Met Phe Leu Lys Leu Ser Glu Val Gly
610 615 620

Lys Phe Lys His Leu Asn Lys Ile Cys Tyr Asn Arg Val Leu His Gly
625 630 635 640

Asp Asn Thr Ser Ile Lys Lys Leu Gly Ile Gln Lys Lys Asn His Phe
645 650 655

Val Val Val Asn Gln Ser Leu Asn Arg Gln Gly Ile Thr Tyr Tyr Asn
660 665 670

Tyr Asp Glu Phe Asp Asp Leu Asp Glu Ser Arg Lys Tyr Ile Phe Asn
675 680 685

Lys Thr Ala Glu Tyr Gln Glu Glu Ile Asp Ile Leu Lys Asp Ile
690 695 700

<210> 10
<211> 1953
<212> DNA
<213> Pasteurella multocida

<400> 10
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aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat 180

aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt 240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg 300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca 360

aaagattttc ccaaagatct ggttttagcg cctttacctg atcatgttaa tgattttaca 420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt 480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta 540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa 600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa 660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat 720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat 780

gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat 840

acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca 900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg 960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt 1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat 1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac 1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa 1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag 1260

gtcccttata tctatagaaa acttttacca atagaagatt cgcatatcaa tagagtacct 1320

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ctcacaacgg ctatgattgc tcaccacttt agaatgttca cgattagagc ttggcattta 1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatgtt cctcaaactc 1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt 1920

gataacacat caattaagaa acttggcatt caa 1953

<210> 11
<211> 2112
<212> DNA
<213> Pasteurella multocida

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aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat 180

aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt 240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg 300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca 360

aaagattttc ccaaagatct ggttttagcg cctttacctg atcatgttaa tgattttaca 420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt 480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta 540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa 600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa 660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat 720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat 780

gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat 840

acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca 900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg 960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt 1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat 1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac 1140

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gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag 1260

gtcccttata tctatagaaa acttttacca atagaagatt cgcatatcaa tagagtacct 1320

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agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacaa tggttcaaca 1440

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tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaaggt 1560

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ttaaaagaat ttttaaaaga taaaacgcta gcttgtgttt ataccactaa tagaaacgtc 1680

aatccggatg gtagcttaat cgctaatggt tacaattggc cagaattttc acgagaaaaa 1740

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actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatgtt cctcaaactc 1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt 1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat 1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat 2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta 2100

aaagatattt aa 2112

<210> 12
<211> 2112
<212> DNA
<213> Pasteurella multocida

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tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta 540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagataatgg tagtcaggaa 600

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<212> DNA
<213> Pasteurella multocida

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gcagttgaac tgtgtttaaa agaattttta aaagataaaa cgctagcttg tgtttatacc 360

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<211> 966
<212> DNA
<213> Pasteurella multocida

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gagattgata tcttaaaaga tattaaaatc atccagaata aagatgccaa aatcgcagtc 840

agtatttttt atcccaatac attaaacggc ttagtgaaaa aactaaacaa tattattgaa 900

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gttatcgtga cagatgatgg tagtcaggaa gatctatcac cgatcattcg ccaatatgaa 180

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aataacgcga gtttgcttga atcattacca gaagtgaaaa ccaataatag tgttgccgca 480

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gccaaaatcg cagtcagtat tttttatccc aatacattaa acggcttagt gaaaaaacta 1740

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<213> Pasteurella multocida

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cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat 2040

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aaagatattt aa 2112

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agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt 1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat 1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat 2040

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<211> 2271
<212> DNA
<213> Pasteurella multocida

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aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat 180

aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt 240

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aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca 360

aaagattttc ccaaagatct ggttttagcg cctttacctg atcatgttaa tgattttaca 420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt 480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta 540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa 600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa 660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat 720

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gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat 1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat 2040

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aaagatatta aaatcatcca gaataaagat gccaaaatcg cagtcagtat tttttatccc 2160

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<210> 21
<211> 1704
<212> DNA
<213> Pasteurella multocida

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aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat 180

aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt 240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg 300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca 360

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tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt 480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta 540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa 600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa 660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat 720

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acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca 900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg 960

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gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac 1140

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aatccggatg gtagcttaat ctaa 1704

<210> 22
<211> 18
<212> PRT
<213> artificial sequence

<220>
<223> synthetic peptide based on residues 526-543 of pmHAS

<400> 22

Leu Asp Ser Asp Asp Tyr Leu Glu Pro Asp Ala Val Glu Leu Cys Leu
1 5 10 15

Lys Glu

<210> 23
<211> 24
<212> DNA
<213> Artificial sequence

<220>
<223> primer Pm10

<400> 23
cactgtctaa ctttattgtt agcc 24

<210> 24
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<212> DNA
<213> Artificial Sequence

<220>
<223> primer Pm21

<400> 24
tttttaacga ataggctgtc 20

<210> 25
<211> 19
<212> PRT
<213> artificial sequence

<220>
<223> synthetic peptide based on residues 526 to 544 of pmHAS protein

<400> 25

Leu Asp Ser Asp Asp Tyr Leu Glu Pro Asp Ala Val Glu Leu Cys Leu
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Lys Glu Phe

<210> 26
<211> 2115
<212> DNA
<213> Pasteurella multocida

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aaatgtaaag aaaaactctc gaccaattct tatgtaagtg aagataaaaa aaacagtgtt 180

tgcgatagct cattagatat cgcaacacag ctcttacttt ccaacgtaaa aaaattaact 240

ctatccgaat cagaaaaaaa cagtttaaaa aataaatgga aatctatcac tgggaaaaaa 300

tcggagaacg cagaaatcag aaaggtggaa ctagtaccca aagattttcc taaagatctt 360
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<210> 27

<211> 1980
<212> DNA
<213> Pasteurella multocida

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attaagaaac ttggcattca aaagaaaaac cattttgttg tagtcaatca gtcattaaat 1860

agacaaggca taacttatta taattatgac gaatttgatg atttagatga aagtagaaag 1920

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<210> 28
<211> 1902
<212> DNA
<213> Pasteurella multocida

<400> 28
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gttatcgtga cagatgatgg tagtcaggaa gatctatcac cgatcattcg ccaatatgaa 420

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tataattatg acgaatttga tgatttagat gaaagtagaa agtatatttt caataaaacc 1860

gctgaatatc aagaagagat tgatatctta aaagatattt aa 1902

<210> 29
<211> 1830
<212> DNA
<213> Pasteurella multocida

<400> 29
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catcaacatg ttggtctttc tattatcgtt acaacattca atcgaccagc aattttatcg 240

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caagagccac caggtaaaga aaatgaaacc gatcgtgaag cgggaaaaaa tattacgctc 960

gatattatga gagaaaaggt cccttatatc tatagaaaac ttttaccaat agaagattcg 1020

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gatgcagttg aactgtgttt aaaagaattt ttaaaagata aaacgctagc ttgtgtttat 1380

accactaata gaaacgtcaa tccggatggt agcttaatcg ctaatggtta caattggcca 1440

gaattttcac gagaaaaact cacaacggct atgattgctc accactttag aatgttcacg 1500

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gacatgttcc tcaaactcag tgaagttgga aaatttaaac atcttaataa aatctgctat 1620

aaccgtgtat tacatggtga taacacatca attaagaaac ttggcattca aaagaaaaac 1680

cattttgttg tagtcaatca gtcattaaat agacaaggca taacttatta taattatgac 1740

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gaagagattg atatcttaaa agatatttaa 1830

<210> 30
<211> 1764
<212> DNA
<213> Pasteurella multocida

<400> 30
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cctttccgtt tttttgcggc gggtaatgtt gctttcgcta aaaaatggct aaataaatcc 720

ggtttctttg atgaggaatt taatcactgg ggtggagaag atgtggaatt tggatatcgc 780

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<210> 31
<211> 2007
<212> DNA
<213> Pasteurella multocida

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gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa 600

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gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat 780

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agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt 1920

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<210> 32
<211> 2061
<212> DNA
<213> Pasteurella multocida

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aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat 180

aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt 240

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aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca 360

aaagattttc ccaaagatct ggttttagcg cctttacctg atcatgttaa tgattttaca 420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt 480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta 540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa 600

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aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat 720

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gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat 1980

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<210> 33
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<213> Pasteurella multocida

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<212> DNA
<213> Pasteurella multocida

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cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat 2040

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gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa 600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa 660

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gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg 960

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gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa 600

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cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat 2040

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aaagatattt aa 2112

<210> 44
<211> 2112
<212> DNA
<213> Pasteurella multocida

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cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat 2040

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aaagatattt aa 2112

<210> 45
<211> 2112
<212> DNA
<213> Pasteurella multocida

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gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa 600

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cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat 2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta 2100

aaagatattt aa 2112

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<211> 2112
<212> DNA
<213> Pasteurella multocida

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<212> DNA
<213> Pasteurella multocida

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cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat 2040

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aaagatattt aa 2112

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aaagatattt aa 2112

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tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat 1080

gaggaattta atcactgggg tggagaaaat gtggaatttg gatatcgctt attccgttac 1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa 1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag 1260

gtcccttata tctatagaaa acttttacca atagaagatt cgcatatcaa tagagtacct 1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat 1380

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gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg 1500

tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaaggt 1560

tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt 1620

ttaaaagaat ttttaaaaga taaaacgcta gcttgtgttt ataccactaa tagaaacgtc 1680

aatccggatg gtagcttaat cgctaatggt tacaattggc cagaattttc acgagaaaaa 1740

ctcacaacgg ctatgattgc tcaccacttt agaatgttca cgattagagc ttggcattta 1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatgtt cctcaaactc 1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt 1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat 1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat 2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta 2100

aaagatattt aa 2112

<210> 50
<211> 2112
<212> DNA
<213> Pasteurella multocida

<400> 50
atgaatacat tatcacaagc aataaaagca tataacagca atgactatca attagcactc 60

aaattatttg aaaagtcggc ggaaatctat ggacggaaaa ttgttgaatt tcaaattacc 120

aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat 180

aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt 240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg 300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca 360

aaagattttc ccaaagatct ggttttagcg cctttacctg atcatgttaa tgattttaca 420
tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt 480
tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta 540
gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa 600
gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa 660
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gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat 780
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gaggaattta atcactgggg tggagaaaaa gtggaatttg gatatcgctt attccgttac 1140
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tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaaggt 1560
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agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt 1920
gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat 1980
cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat 2040
gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta 2100
aaagatattt aa 2112

<210> 51
<211> 2136
<212> DNA

<213> Pasteurella multocida

<400> 51

atgaacacat tatcacaagc aataaaagca tataacagca atgactatca attagcactc 60

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aaatgccaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat 180

aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt 240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg 300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca 360

aaagattttc ccaaagatct ggttttagcg cctttacctg atcatgttaa tgattttaca 420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt 480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta 540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa 600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa 660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat 720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat 780

gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat 840

acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca 900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg 960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt 1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat 1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac 1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa 1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag 1260

gtcccttata tctatagaaa acttttacca atagaagatt cgcatattca tagaatacct 1320

ttagtttcta tttatatccc cgcttataac tgtgcaaatt atattcaaag atgtgtagat 1380

agtgctctta atcaaactgt tgtcgatctc gaggtttgta tttgtaacga tggttcaaca 1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg 1500

tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaaggt 1560

tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt 1620

ttaaaagaat ttttaaaaga taaaacgcta gcttgtgttt ataccactaa tagaaacgtc 1680

aatccggatg gtagcttaat cgctaatggt tacaattggc cagaattttc acgagaaaaa 1740

ctcacaacgg ctatgattgc tcaccatttt agaatgttta cgattagagc ttggcattta 1800

acggatggat ttaacgaaaa tattgaaaac gccgtggatt atgacatgtt ccttaaactc 1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgcgt attacatggt 1920

gataacacat ccattaagaa actcggcatt caaaagaaaa accattttgt tgtagtcaat 1980

cagtcattaa atagacaagg catcaattat tataattatg acaaatttga tgatttagat 2040

gaaagtagaa agtatatctt caataaaacc gctgaatatc aagaagaaat ggatatttta 2100

aaagatctta aactcattca gaataaagat gcctaa 2136

<210> 52
<211> 2091
<212> DNA
<213> Pasteurella multocida

<400> 52
atgaatacat tatcacaagc aataaaagca tataacagca atgactatga attagcactc 60

aaattatttg agaagtctgc tgaaacctac gggcgaaaaa tcgttgaatt ccaaattatc 120

aaatgtaaag aaaaactctc gaccaattct tatgtaagtg aagataaaaa aaacagtgtt 180

tgcgatagct cattagatat cgcaacacag ctcttacttt ccaacgtaaa aaaattaact 240

ctatccgaat cagaaaaaaa cagtttaaaa aataaatgga aatctatcac tgggaaaaaa 300

tcggagaacg cagaaatcag aaaggtggaa ctagtaccca aagattttcc taaagatctt 360

gttcttgctc cattgccaga tcatgttaat gattttacat ggtacaaaaa tcgaaaaaaa 420

agcttaggta taaagcctgt aaataagaat atcggtcttt ctattattat tcctacattt 480

aatcgtagcc gtattttaga tataacgtta gcctgtttgg tcaatcagaa aacaaactac 540

ccatttgaag tcgttgttgc agatgatggt agtaaggaaa acttacttac cattgtgcaa 600

aaatacgaac aaaaacttga cataaagtat gtaagacaaa aagattatgg atatcaattg 660

tgtgcagtca gaaacttagg tttacgtaca gcaaagtatg attttgtctc gattctagac 720

tgcgatatgg caccacaaca attatgggtt cattcttatc ttacagaact attagaagac 780

aatgatattg ttttaattgg acctagaaaa tatgtggata ctcataatat taccgcagaa 840

caattcctta acgatccata tttaatagaa tcactacctg aaaccgctac aaataacaat 900

ccttcgatta catcaaaagg aaatatatcg ttggattgga gattagaaca tttcaaaaaa 960

accgataatc tacgtctatg tgattcaccg tttcgttatt ttagttgcgg taatgttgca 1020

ttttctaaag aatggctaaa taaagtaggt tggttcgatg aagaatttaa tcattggggg 1080

ggcgaagatg tagaatttgg ttacagatta tttgccaaag gctgtttttt cagagtaatt 1140

gacggcggaa tggcatacca tcaagaacca cctggtaaag aaaatgaaac agaccgcgaa 1200

gctggtaaaa gtattacgct taaaattgtg aaagaaaagg taccttacat ctatagaaaa 1260

cttttaccaa tagaagattc gcatatcaat agagtacctt tagtttcaat ttatatccca 1320

gcttataact gtgcaaacta tattcaacgt tgcgtagata gtgcactgaa tcagactgtt 1380

gttgatctcg aggtttgtat ttgtaacgat ggttcaacag ataatacctt agaagtgatc 1440

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gcctcagcat caaatgcagc cgtttctttt gctaaaggtt attacattgg gcagttagat 1560

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aaaacgctag cttgtgttta taccactaat agaaacgtca atccggatgg tagcttaatc 1680

gctaatggtt acaattggcc agaattttca cgagaaaaac tcacaacggc tatgattgct 1740

caccacttta gaatgttcac gattagagct tggcatttaa ctgatggatt caatgaaaaa 1800

attgaaaatg ccgtagacta tgacatgttc ctcaaactca gtgaagttgg aaaatttaaa 1860

catcttaata aaatctgcta taaccgtgta ttacatggtg ataacacatc aattaagaaa 1920

cttggcattc aaaagaaaaa ccattttgtt gtagtcaatc agtcattaaa tagacaaggc 1980

ataacttatt ataattatga cgaatttgat gatttagatg aaagtagaaa gtatattttc 2040

aataaaaccg ctgaatatca agaagagatt gatatcttaa aagatattta a 2091

<210> 53
<211> 29
<212> DNA
<213> artificial sequence

<220>
<223> primer P1

<400> 53
atgaacacat tatcacaagc aataaaagc 29

<210> 54
<211> 27
<212> DNA
<213> artificial sequence

<220>
<223> primer P2

<220>
<221> misc_feature
<222> (23)..(23)
<223> Y = C/T

<400> 54
gcgaatcttc tattggtaaa agytttc 27

<210> 55
<211> 26
<212> DNA
<213> artificial sequence

<220>
<223> primer P3

<400> 55

cttttaccaa tagaagattc gcatat 26

<210> 56
<211> 33
<212> DNA
<213> artificial sequence

<220>
<223> primer P4

<400> 56
gaagacgtct taggcatctt tattctgaat gag 33

<210> 57
<211> 43
<212> DNA
<213> artificial sequence

<220>
<223> primer P5

<400> 57
gggaattctg cagttaaata tcttttaaga tatcaatctc ttc 43

<210> 58
<211> 33
<212> DNA
<213> artificial sequence

<220>
<223> sense primer

<220>
<221> misc_feature
<222> (9)..(9)
<223> inosine

<220>
<221> misc_feature
<222> (12)..(12)
<223> inosine

<220>
<221> misc_feature
<222> (18)..(18)
<223> inosine

<220>
<221> misc_feature
<222> (24)..(24)
<223> inosine

<220>
<221> misc_feature
<222> (27)..(27)
<223> inosine

<400> 58
garttybtnm rngarggnaa rgcnytntay gay 33

<210> 59
<211> 39
<212> DNA
<213> artificial sequence

<220>
<223> antisense primer

<220>
<221> misc_feature
<222> (7)..(7)
<223> inosine

<220>
<221> misc_feature
<222> (10)..(10)
<223> inosine

<220>
<221> misc_feature
<222> (16)..(16)
<223> inosine

<220>
<221> misc_feature
<222> (22)..(22)
<223> inosine

<220>
<221> misc_feature
<222> (25)..(25)
<223> A, G, C or T

<400> 59
rcartanccn ccrtanccra answnggrtt rttrtartg 39

<210> 60
<211> 30
<212> DNA
<213> artificial sequence

<220>
<223> 2nd antisense primer

<400> 60
tatatttaca gcagtatcat tttctaaagg 30

<210> 61
<211> 501
<212> PRT
<213> Pasteurella multocida

<400> 61

Met Ser Leu Phe Lys Arg Ala Thr Glu Leu Phe Lys Ser Gly Asn Tyr
1 5 10 15

Lys Asp Ala Leu Thr Leu Tyr Glu Asn Ile Ala Lys Ile Tyr Gly Ser
20 25 30

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Glu Ser Leu Val Lys Tyr Asn Ile Asp Ile Cys Lys Lys Asn Ile Thr
        35                  40                  45

Gln Ser Lys Ser Asn Lys Ile Glu Glu Asp Asn Ile Ser Gly Glu Asn
    50                  55                  60

Glu Phe Ser Val Ser Ile Lys Asp Leu Tyr Asn Glu Ile Ser Asn Ser
65                  70                  75                  80

Glu Leu Gly Ile Thr Lys Glu Arg Leu Gly Ala Pro Pro Leu Val Ser
                85                  90                  95

Ile Ile Met Thr Ser His Asn Thr Glu Lys Phe Ile Glu Ala Ser Ile
            100                 105                 110

Asn Ser Leu Leu Leu Gln Thr Tyr Asn Asn Leu Glu Val Ile Val Val
        115                 120                 125

Asp Asp Tyr Ser Thr Asp Lys Thr Phe Gln Ile Ala Ser Arg Ile Ala
    130                 135                 140

Asn Ser Thr Ser Lys Val Lys Thr Phe Arg Leu Asn Ser Asn Leu Gly
145                 150                 155                 160

Thr Tyr Phe Ala Lys Asn Thr Gly Ile Leu Lys Ser Lys Gly Asp Ile
                165                 170                 175

Ile Phe Phe Gln Asp Ser Asp Asp Val Cys His His Glu Arg Ile Glu
            180                 185                 190

Arg Cys Val Asn Ala Leu Leu Ser Asn Lys Asp Asn Ile Ala Val Arg
        195                 200                 205

Cys Ala Tyr Ser Arg Ile Asn Leu Glu Thr Gln Asn Ile Ile Lys Val
    210                 215                 220

Asn Asp Asn Lys Tyr Lys Leu Gly Leu Ile Thr Leu Gly Val Tyr Arg
225                 230                 235                 240

Lys Val Phe Asn Glu Ile Gly Phe Phe Asn Cys Thr Thr Lys Ala Ser
                245                 250                 255

Asp Asp Glu Phe Tyr His Arg Ile Ile Lys Tyr Tyr Gly Lys Asn Arg
            260                 265                 270

Ile Asn Asn Leu Phe Leu Pro Leu Tyr Tyr Asn Thr Met Arg Glu Asp
        275                 280                 285
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Ser Leu Phe Ser Asp Met Val Glu Trp Val Asp Glu Asn Asn Ile Lys
290 295 300

Gln Lys Thr Ser Asp Ala Arg Gln Asn Tyr Leu His Glu Phe Gln Lys
305 310 315 320

Ile His Asn Glu Arg Lys Phe Asn Glu Leu Lys Glu Ile Phe Ser Phe
325 330 335

Pro Arg Ile His Asp Ala Leu Pro Ile Ser Lys Glu Met Ser Lys Leu
340 345 350

Ser Asn Pro Lys Ile Pro Val Tyr Ile Asn Ile Cys Ser Ile Pro Ser
355 360 365

Arg Ile Lys Gln Leu Gln Tyr Thr Ile Gly Val Leu Lys Asn Gln Cys
370 375 380

Asp His Phe His Ile Tyr Leu Asp Gly Tyr Pro Glu Val Pro Asp Phe
385 390 395 400

Ile Lys Lys Leu Gly Asn Lys Ala Thr Val Ile Asn Cys Gln Asn Lys
405 410 415

Asn Glu Ser Ile Arg Asp Asn Gly Lys Phe Ile Leu Leu Glu Lys Leu
420 425 430

Ile Lys Glu Asn Lys Asp Gly Tyr Tyr Ile Thr Cys Asp Asp Asp Ile
435 440 445

Arg Tyr Pro Ala Asp Tyr Ile Asn Thr Met Ile Lys Lys Ile Asn Lys
450 455 460

Tyr Asn Asp Lys Ala Ala Ile Gly Leu His Gly Val Ile Phe Pro Ser
465 470 475 480

Arg Val Asn Lys Tyr Phe Ser Ser Asp Arg Ile Val Tyr Asn Phe Gln
485 490 495

Lys Thr Phe Arg Lys
500

<210> 62
<211> 1510
<212> DNA
<213> Pasteurella multocida

<400> 62

aatgagctta tttaaacgtg ctactgagct atttaagtca ggaaactata aagatgcact 60

aactctatat gaaaatatag ctaaaattta tggttcagaa agccttgtta aatataatat 120

tgatatatgt aaaaaaaata taacacaatc aaaaagtaat aaaatagaag aagataatat 180

ttctggagaa aacgaatttt cagtatcaat aaaagatcta tataacgaaa taagcaatag 240

tgaattaggg attacaaaag aaagactagg agcccccct ctagtcagta ttataatgac 300

ttctcataat acagaaaaat tcattgaagc ctcaattaat tcactattat tgcaaacata 360

caataactta gaagttatcg ttgtagatga ttatagcaca gataaaacat ttcagatcgc 420

atccagaata gcaaactcta caagtaaagt aaaaacattc cgattaaact caaatctagg 480

gacatacttt gcgaaaaata caggaatttt aaagtctaaa ggagatatta ttttctttca 540

ggatagcgat gatgtatgtc accatgaaag aatcgaaaga tgtgttaatg cattattatc 600

gaataaagat aatatagctg ttagatgtgc atattctaga ataaatctag aaacacaaaa 660

tataataaaa gttaatgata ataaatacaa attaggatta ataactttag gcgtttatag 720

aaaagtattt aatgaaattg gttttttaa ctgcacaacc aaagcatcgg atgatgaatt 780

ttatcataga ataattaaat actatggtaa aaataggata aataacttat ttctaccact 840

gtattataac acaatgcgtg aagattcatt attttctgat atggttgagt gggtagatga 900

aaataatata aagcaaaaaa cctctgatgc tagacaaaat tatctccatg aattccaaaa 960

aatacacaat gaaaggaaat ttaatgaatt aaaagagatt tttagctttc ctagaattca 1020

tgacgcctta cctatatcaa aagaaatgag taagctcagc aaccctaaaa ttcctgttta 1080

tataaatata tgctcaatac cttcaagaat aaaacaactt caatacacta ttggagtact 1140

aaaaaaccaa tgcgatcatt ttcatattta tcttgatgga tatccagaag tacctgattt 1200

tataaaaaaa ctagggaata aagcgaccgt tattaattgt caaaacaaaa atgagtctat 1260

tagagataat ggaaagttta ttctattaga aaaacttata aaggaaaata aagatggata 1320

ttatataact tgtgatgatg atatccggta tcctgctgac tacataaaca ctatgataaa 1380

aaaaattaat aaatacaatg ataaagcagc aattggatta catggtgtta tattcccaag 1440

tagagtcaac aagtattttt catcagacag aattgtctat aattttcaaa aaacctttag 1500

aaaatgatac 1510

<210> 63
<211> 238
<212> PRT
<213> Escherichia coli

<400> 63

Met Ile Val Ala Asn Met Ser Ser Tyr Pro Pro Arg Lys Lys Glu Leu
1 5 10 15

Val His Ser Ile Gln Ser Leu His Ala Gln Val Asp Lys Ile Asn Leu
20 25 30

Cys Leu Asn Glu Phe Glu Glu Ile Pro Glu Glu Leu Asp Gly Phe Ser
35 40 45

Lys Leu Asn Pro Val Ile Pro Asp Lys Asp Tyr Lys Asp Val Gly Lys
50 55 60

Phe Ile Phe Pro Cys Ala Lys Asn Asp Met Ile Val Leu Thr Asp Asp
65 70 75 80

Asp Ile Ile Tyr Pro Pro Asp Tyr Val Glu Lys Met Leu Asn Phe Tyr
85 90 95

Asn Ser Phe Ala Ile Phe Asn Cys Ile Val Gly Ile His Gly Cys Ile
100 105 110

Tyr Ile Asp Ala Phe Asp Gly Asp Gln Ser Lys Arg Lys Val Phe Ser
115 120 125

Phe Thr Gln Gly Leu Leu Arg Pro Arg Val Val Asn Gln Leu Gly Thr
130 135 140

Gly Thr Val Phe Leu Lys Ala Asp Gln Leu Pro Ser Leu Lys Tyr Met
145 150 155 160

Asp Gly Ser Gln Arg Phe Val Asp Val Arg Phe Ser Arg Tyr Met Leu
165 170 175

Glu Asn Glu Ile Gly Met Ile Cys Val Pro Arg Glu Lys Asn Trp Leu
180 185 190

Arg Glu Val Ser Ser Gly Ser Met Glu Gly Leu Trp Asn Thr Phe Thr
195 200 205

Lys Lys Trp Pro Leu Asp Ile Ile Lys Glu Thr Gln Ala Ile Ala Gly
210 215 220

Tyr Ser Lys Leu Asn Leu Glu Leu Val Tyr Asn Val Glu Gly
225 230 235

<210> 64
<211> 520
<212> PRT
<213> Escherichia coli

<400> 64

Met Asn Ala Glu Tyr Ile Asn Leu Val Glu Arg Lys Lys Lys Leu Gly

1 5 10 15

Thr Asn Ile Gly Ala Leu Asp Phe Leu Leu Ser Ile His Lys Glu Lys
20 25 30

Val Asp Leu Gln His Lys Asn Ser Pro Leu Lys Gly Asn Asp Asn Leu
35 40 45

Ile His Lys Arg Ile Asn Glu Tyr Asp Asn Val Leu Glu Leu Ser Lys
50 55 60

Asn Val Ser Ala Gln Asn Ser Gly Asn Glu Phe Ser Tyr Leu Leu Gly
65 70 75 80

Tyr Ala Asp Ser Leu Arg Lys Val Gly Met Leu Asp Thr Tyr Ile Lys
85 90 95

Ile Val Cys Tyr Leu Thr Ile Gln Ser Arg Tyr Phe Lys Asn Gly Glu
100 105 110

Arg Val Lys Leu Phe Glu His Ile Ser Asn Ala Leu Arg Tyr Ser Arg
115 120 125

Ser Asp Phe Leu Ile Asn Leu Ile Phe Glu Arg Tyr Ile Glu Tyr Ile
130 135 140

Asn His Leu Lys Leu Ser Pro Lys Gln Lys Asp Phe Tyr Phe Cys Thr
145 150 155 160

Lys Phe Ser Lys Phe His Asp Tyr Thr Lys Asn Gly Tyr Lys Tyr Leu
165 170 175

Ala Phe Asp Asn Gln Ala Asp Ala Gly Tyr Gly Leu Thr Leu Leu Leu
180 185 190

Asn Ala Asn Asp Asp Met Gln Asp Ser Tyr Asn Leu Leu Pro Glu Gln
195 200 205

Glu Leu Phe Ile Cys Asn Ala Val Ile Asp Asn Met Asn Ile Tyr Arg
210 215 220

Ser Gln Phe Asn Lys Cys Leu Arg Lys Tyr Asp Leu Ser Glu Ile Thr
225 230 235 240

Asp Ile Tyr Pro Asn Lys Ile Ile Leu Gln Gly Ile Lys Phe Asp Lys
245 250 255

Lys Lys Asn Val Tyr Gly Lys Asp Leu Val Ser Ile Ile Met Ser Val

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            260                 265                 270

Phe Asn Ser Glu Asp Thr Ile Ala Tyr Ser Leu His Ser Leu Leu Asn
        275                 280                 285

Gln Thr Tyr Glu Asn Ile Glu Ile Leu Val Cys Asp Asp Cys Ser Ser
    290                 295                 300

Asp Lys Ser Leu Glu Ile Ile Lys Ser Ile Ala Tyr Ser Ser Ser Arg
305                 310                 315                 320

Val Lys Val Tyr Ser Ser Arg Lys Asn Gln Gly Pro Tyr Asn Ile Arg
                325                 330                 335

Asn Glu Leu Ile Lys Lys Ala His Gly Asn Phe Ile Thr Phe Gln Asp
            340                 345                 350

Ala Asp Asp Leu Ser His Pro Glu Arg Ile Gln Arg Gln Val Glu Val
        355                 360                 365

Leu Arg Asn Asn Lys Ala Val Ile Cys Met Ala Asn Trp Ile Arg Val
    370                 375                 380

Ala Ser Asn Gly Lys Ile Gln Phe Phe Tyr Asp Asp Lys Ala Thr Arg
385                 390                 395                 400

Met Ser Val Val Ser Ser Met Ile Lys Lys Asp Ile Phe Ala Thr Val
                405                 410                 415

Gly Gly Tyr Arg Gln Ser Leu Ile Gly Ala Asp Thr Glu Phe Tyr Glu
            420                 425                 430

Thr Val Ile Met Arg Tyr Gly Arg Glu Ser Ile Val Arg Leu Leu Gln
        435                 440                 445

Pro Leu Ile Leu Gly Leu Trp Gly Asp Ser Gly Leu Thr Arg Asn Lys
    450                 455                 460

Gly Thr Glu Ala Leu Pro Asp Gly Tyr Ile Ser Gln Ser Arg Arg Glu
465                 470                 475                 480

Tyr Ser Asp Ile Ala Ala Arg Gln Arg Val Leu Gly Lys Ser Ile Val
                485                 490                 495

Ser Asp Lys Asp Val Arg Gly Leu Leu Ser Arg Tyr Gly Leu Phe Lys
            500                 505                 510

Asp Val Ser Gly Ile Ile Glu Gln
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515 520

<210> 65
<211> 746
<212> PRT
<213> Mus musculus

<400> 65

Met Gln Ala Lys Lys Arg Tyr Phe Ile Leu Leu Ser Ala Gly Ser Cys
1 5 10 15

Leu Ala Leu Leu Phe Tyr Phe Gly Gly Val Gln Phe Arg Ala Ser Arg
20 25 30

Ser His Ser Arg Arg Glu Glu His Ser Gly Arg Asn Gly Leu His Gln
35 40 45

Pro Ser Pro Asp His Phe Trp Pro Arg Phe Pro Asp Ala Leu Arg Pro
50 55 60

Phe Phe Pro Trp Asp Gln Leu Glu Asn Glu Asp Ser Ser Val His Ile
65 70 75 80

Ser Pro Arg Gln Lys Arg Asp Ala Asn Ser Ser Ile Tyr Lys Gly Lys
85 90 95

Lys Cys Arg Met Glu Ser Cys Phe Asp Phe Thr Leu Cys Lys Lys Asn
100 105 110

Gly Phe Lys Val Tyr Val Tyr Pro Gln Gln Lys Gly Glu Lys Ile Ala
115 120 125

Glu Ser Tyr Gln Asn Ile Leu Ala Ala Ile Glu Gly Ser Arg Phe Tyr
130 135 140

Thr Ser Asp Pro Ser Gln Ala Cys Leu Phe Val Leu Ser Leu Asp Thr
145 150 155 160

Leu Asp Arg Asp Gln Leu Ser Pro Gln Tyr Val His Asn Leu Arg Ser
165 170 175

Lys Val Gln Ser Leu His Leu Trp Asn Asn Gly Arg Asn His Leu Ile
180 185 190

Phe Asn Leu Tyr Ser Gly Thr Trp Pro Asp Tyr Thr Glu Asp Val Gly
195 200 205

Phe Asp Ile Gly Gln Ala Met Leu Ala Lys Ala Ser Ile Ser Thr Glu
210 215 220

Asn Phe Arg Pro Asn Phe Asp Val Ser Ile Pro Leu Phe Ser Lys Asp
225 230 235 240

His Pro Arg Thr Gly Gly Glu Arg Gly Phe Leu Lys Phe Asn Thr Ile
245 250 255

Pro Pro Leu Arg Lys Tyr Met Leu Val Phe Lys Gly Lys Arg Tyr Leu
260 265 270

Thr Gly Ile Gly Ser Asp Thr Arg Asn Ala Leu Tyr His Val His Asn
275 280 285

Gly Glu Asp Val Leu Leu Leu Thr Thr Cys Lys His Gly Lys Asp Trp
290 295 300

Gln Lys His Lys Asp Ser Arg Cys Asp Arg Asp Asn Thr Glu Tyr Glu
305 310 315 320

Lys Tyr Asp Tyr Arg Glu Met Leu His Asn Ala Thr Phe Cys Leu Val
325 330 335

Pro Arg Gly Arg Arg Leu Gly Ser Phe Arg Phe Leu Glu Ala Leu Gln
340 345 350

Ala Ala Cys Val Pro Val Met Leu Ser Asn Gly Trp Glu Leu Pro Phe
355 360 365

Ser Glu Val Ile Asn Trp Asn Gln Ala Ala Val Ile Gly Asp Glu Arg
370 375 380

Leu Leu Leu Gln Ile Pro Ser Thr Ile Arg Ser Ile His Gln Asp Lys
385 390 395 400

Ile Leu Ala Leu Arg Gln Gln Thr Gln Phe Leu Trp Glu Ala Tyr Phe
405 410 415

Ser Ser Val Glu Lys Ile Val Leu Thr Thr Leu Glu Ile Ile Gln Asp
420 425 430

Arg Ile Phe Lys His Ile Ser Arg Asn Ser Leu Ile Trp Asn Lys His
435 440 445

Pro Gly Gly Leu Phe Val Leu Pro Gln Tyr Ser Ser Tyr Leu Gly Asp
450 455 460

Phe Pro Tyr Tyr Tyr Ala Asn Leu Gly Leu Lys Pro Pro Ser Lys Phe
465 470 475 480

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Thr Ala Val Ile His Ala Val Thr Pro Leu Val Ser Gln Ser Gln Pro
                485                 490                 495

Val Leu Lys Leu Leu Val Ala Ala Ala Lys Ser Gln Tyr Cys Ala Gln
            500                 505                 510

Ile Ile Val Leu Trp Asn Cys Asp Lys Pro Leu Pro Ala Lys His Arg
        515                 520                 525

Trp Pro Ala Thr Ala Val Pro Val Ile Val Ile Glu Gly Glu Ser Lys
    530                 535                 540

Val Met Ser Ser Arg Phe Leu Pro Tyr Asp Asn Ile Ile Thr Asp Ala
545                 550                 555                 560

Val Leu Ser Leu Asp Glu Asp Thr Val Leu Ser Thr Thr Glu Val Asp
                565                 570                 575

Phe Ala Phe Thr Val Trp Gln Ser Phe Pro Glu Arg Ile Val Gly Tyr
            580                 585                 590

Pro Ala Arg Ser His Phe Trp Asp Asn Ser Lys Glu Arg Trp Gly Tyr
        595                 600                 605

Thr Ser Lys Trp Thr Asn Asp Tyr Ser Met Val Leu Thr Gly Ala Ala
    610                 615                 620

Ile Tyr His Lys Tyr Tyr His Tyr Leu Tyr Ser His Tyr Leu Pro Ala
625                 630                 635                 640

Ser Leu Lys Asn Met Val Asp Gln Leu Ala Asn Cys Glu Asp Ile Leu
                645                 650                 655

Met Asn Phe Leu Val Ser Ala Val Thr Lys Leu Pro Pro Ile Lys Val
            660                 665                 670

Thr Gln Lys Lys Gln Tyr Lys Glu Thr Met Met Gly Gln Thr Ser Arg
        675                 680                 685

Ala Ser Arg Trp Ala Asp Pro Asp His Phe Ala Gln Arg Gln Ser Cys
    690                 695                 700

Met Asn Thr Phe Ala Ser Trp Phe Gly Tyr Met Pro Leu Ile His Ser
705                 710                 715                 720

Gln Met Arg Leu Asp Pro Val Leu Phe Lys Asp Gln Val Ser Ile Leu
                725                 730                 735
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Arg Lys Lys Tyr Arg Asp Ile Glu Arg Leu
740 745

<210> 66
<211> 718
<212> PRT
<213> Mus musculus

<400> 66

Met Cys Ala Ser Val Lys Ser Asn Ile Arg Gly Pro Ala Leu Ile Pro
1 5 10 15

Arg Met Lys Thr Lys His Arg Ile Tyr Tyr Val Thr Leu Phe Ser Ile
20 25 30

Val Leu Leu Gly Leu Ile Ala Thr Gly Met Phe Gln Phe Trp Pro His
35 40 45

Ser Ile Glu Ser Ser Ser Asp Gly Gly Val Glu Lys Arg Ser Ile Arg
50 55 60

Glu Val Pro Val Val Arg Leu Pro Thr Asp Ser Pro Ile Pro Glu Arg
65 70 75 80

Gly Asp Leu Ser Cys Arg Met His Thr Cys Phe Asp Val Tyr Arg Cys
85 90 95

Gly Phe Asn Pro Lys Asn Lys Ile Lys Val Tyr Ile Tyr Pro Leu Lys
100 105 110

Lys Tyr Val Asp Asp Ala Gly Val Pro Val Ser Ser Ala Ile Ser Arg
115 120 125

Glu Tyr Asn Glu Leu Leu Thr Ala Ile Ser Asp Ser Asp Tyr Tyr Thr
130 135 140

Asp Asp Ile Asn Arg Ala Cys Leu Phe Val Pro Ser Ile Asp Val Leu
145 150 155 160

Asn Gln Asn Pro Leu Arg Ile Lys Glu Thr Ala Gln Ala Leu Ala Gln
165 170 175

Leu Ser Arg Trp Asp Arg Gly Thr Asn His Leu Leu Phe Asn Met Leu
180 185 190

Pro Gly Ala Pro Pro Asp Tyr Asn Thr Ala Leu Asp Val Pro Arg Asp
195 200 205

Arg Ala Leu Leu Ala Gly Gly Gly Phe Ser Thr Trp Thr Tyr Arg Gln
210 215 220

Gly Tyr Asp Val Ser Ile Pro Val Phe Ser Pro Leu Ser Ala Glu Met
225 230 235 240

Ala Leu Pro Glu Lys Ala Pro Gly Pro Arg Arg Tyr Phe Leu Leu Ser
245 250 255

Ser Gln Met Ala Ile His Pro Glu Tyr Arg Glu Glu Leu Glu Ala Leu
260 265 270

Gln Ala Lys His Gln Glu Ser Val Leu Val Leu Asp Lys Cys Thr Asn
275 280 285

Leu Ser Glu Gly Val Leu Ser Val Arg Lys Arg Cys His Gln His Gln
290 295 300

Val Phe Asp Tyr Pro Gln Val Leu Gln Glu Ala Thr Phe Cys Thr Val
305 310 315 320

Leu Arg Arg Ala Arg Leu Gly Gln Ala Val Leu Ser Asp Val Leu Gln
325 330 335

Ala Gly Cys Val Pro Val Val Ile Ala Asp Ser Tyr Ile Leu Pro Phe
340 345 350

Ser Glu Val Leu Asp Trp Lys Lys Ala Ser Val Val Val Pro Glu Glu
355 360 365

Lys Met Ser Asp Val Tyr Ser Ile Leu Gln Asn Ile Pro Gln Arg Gln
370 375 380

Ile Glu Glu Met Gln Arg Gln Ala Arg Trp Phe Trp Glu Ala Tyr Phe
385 390 395 400

Gln Ser Ile Lys Ala Ile Ala Leu Ala Thr Leu Gln Ile Ile Asn Asp
405 410 415

Arg Ile Tyr Pro Tyr Ala Ala Ile Ser Tyr Glu Glu Trp Asn Asp Pro
420 425 430

Pro Ala Val Lys Trp Ala Ser Val Ser Asn Pro Leu Phe Leu Pro Leu
435 440 445

Ile Pro Pro Gln Ser Gln Gly Phe Thr Ala Ile Val Leu Thr Tyr Asp
450 455 460

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Arg Val Glu Ser Leu Phe Arg Val Ile Thr Glu Val Ser Lys Val Pro
465                 470                 475                 480

Ser Leu Ser Lys Leu Leu Val Val Trp Asn Asn Gln Asn Lys Asn Pro
                485                 490                 495

Pro Glu Glu Ser Leu Trp Pro Lys Ile Arg Val Pro Leu Lys Val Val
            500                 505                 510

Arg Thr Ala Glu Asn Lys Leu Ser Asn Arg Phe Phe Pro Tyr Asp Glu
        515                 520                 525

Ile Glu Thr Glu Ala Val Leu Ala Ile Asp Asp Asp Ile Ile Met Leu
    530                 535                 540

Thr Ser Asp Glu Leu Gln Phe Gly Tyr Glu Val Trp Arg Glu Phe Pro
545                 550                 555                 560

Asp Arg Leu Val Gly Tyr Pro Gly Arg Leu His Leu Trp Asp His Glu
                565                 570                 575

Met Asn Lys Trp Lys Tyr Glu Ser Glu Trp Thr Asn Glu Val Ser Met
            580                 585                 590

Val Leu Thr Gly Ala Ala Phe Tyr His Lys Tyr Phe Asn Tyr Leu Tyr
        595                 600                 605

Thr Tyr Lys Met Pro Gly Asp Ile Lys Asn Trp Val Asp Ala His Met
    610                 615                 620

Asn Cys Glu Asp Ile Ala Met Asn Phe Leu Val Ala Asn Val Thr Gly
625                 630                 635                 640

Lys Ala Val Ile Lys Val Thr Pro Arg Lys Lys Phe Lys Cys Pro Glu
                645                 650                 655

Cys Thr Ala Ile Asp Gly Leu Ser Leu Asp Gln Thr His Met Val Glu
            660                 665                 670

Arg Ser Glu Cys Ile Asn Lys Phe Ala Ser Val Phe Gly Thr Met Pro
        675                 680                 685

Leu Lys Val Val Glu His Arg Ala Asp Pro Val Leu Tyr Lys Asp Asp
    690                 695                 700

Phe Pro Glu Lys Leu Lys Ser Phe Pro Asn Ile Gly Ser Leu
705                 710                 715
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<210> 67
<211> 76
<212> PRT
<213> Artificial Sequence

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<220>
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<222> (4)..(4)
<223> ANY AMINO ACID

<220>
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<222> (6)..(6)
<223> Leu or Ile

<220>
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<222> (8)..(11)
<223> any amino acid

<220>
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<222> (14)..(14)
<223> any amino acid

<220>
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<223> Ser or Thr

<220>
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<223> Ser or Thr

<220>
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<223> Lys or Asn

<220>
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<222> (19)..(19)
<223> Thr or Ser

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<223> any amino acid

<220>
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<223> any amino acid

<220>
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<222> (29)..(31)
<223> Ser or Thr

<220>
<221> MISC_FEATURE
<222> (32)..(32)
<223> Lys or Arg

<220>
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<223> Lys or Arg

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<223> any amino acid

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<223> any amino acid

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<223> any amino acid

<220>
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<222> (65)..(65)
<223> any amino acid

<220>
<221> MISC_FEATURE
<222> (68)..(68)
<223> any amino acid

<220>
<221> MISC_FEATURE
<222> (69)..(69)
<223> Cys or Ser

<220>
<221> MISC_FEATURE
<222> (71)..(71)
<223> His or Pro

<220>
<221> MISC_FEATURE
<222> (75)..(75)
<223> any amino acid

<400> 67

Gln Thr Tyr Xaa Asn Xaa Glu Xaa Xaa Xaa Xaa Asp Asp Xaa Xaa Xaa
1 5 10 15

Asp Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Ile Ala Xaa Xaa Xaa Xaa Xaa
20 25 30

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Val Xaa Xaa Xaa Xaa Xaa Xaa Xaa Asn Xaa Gly Xaa Tyr Xaa Xaa Xaa
        35                  40                  45

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Phe Gln Asp
    50                  55                  60

Xaa Asp Asp Xaa Xaa His Xaa Glu Arg Ile Xaa Arg
65                  70                  75
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<210> 68
<211> 102
<212> PRT
<213> Artificial Sequence

<220>
<223> motif

<220>
<221> MISC_FEATURE
<222> (1)..(1)
<223> Lys or Arg

<220>
<221> MISC_FEATURE
<222> (3)..(3)
<223> any amino acid

<220>
<221> MISC_FEATURE
<222> (8)..(19)
<223> each position may be any amino acid

<220>
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<222> (20)..(24)
<223> may be missing from sequence; each position may be any amino acid

<220>
<221> MISC_FEATURE
<222> (20)..(24)
<223> all or part of sequence comprising residues 20-24 may be missing;
each position may be any amino acid

<220>
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<222> (29)..(29)
<223> Arg or Ile

<220>
<221> MISC_FEATURE
<222> (32)..(32)
<223> amy amino acid

<220>
<221> MISC_FEATURE
<222> (35)..(37)
<223> any amino acid

<220>
<221> MISC_FEATURE
<222> (39)..(84)
<223> each position may be any amino acid

<220>
<221> MISC_FEATURE
<222> (85)..(94)
<223> all or part of sequence comprising residues 85-94 may be missing; each position may be any amino acid

<220>
<221> MISC_FEATURE
<222> (96)..(96)
<223> any amino acid

<400> 68

Xaa Asp Xaa Gly Lys Phe Ile Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Asp Asp Asp Ile Xaa Tyr Pro Xaa
20 25 30

Asp Tyr Xaa Xaa Xaa Met Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
35 40 45

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
50 55 60

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
65 70 75 80

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Val Asn Xaa
85 90 95

Leu Gly Thr Gly Thr Val
100

<210> 69
<211> 1854
<212> DNA
<213> Pasteurella multocida

<400> 69
atgagcttat ttaaacgtgc tactgagcta tttaagtcag gaaactataa agatgcacta 60

actctatatg aaaatatagc taaaatttat ggttcagaaa gccttgttaa atataatatt 120

gatatatgta aaaaaaatat aacacaatca aaaagtaata aaatagaaga agataatatt 180

tctggagaaa acaaattttc agtatcaata aaagatctat ataacgaaat aagcaatagt 240

gaattaggga ttacaaaaga aagactagga gccccccctc tagtcagtat tataatgact 300

tctcataata cagaaaaatt cattgaagcc tcaattaatt cactattatt gcaaacatac 360

aataacttag aagttatcgt tgtagatgat tatagcacag ataaaacatt tcagatcgca 420

tccagaatag caaactctac aagtaaagta aaaacattcc gattaaactc aaatctaggg 480

acatactttg cgaaaaatac aggaatttta aagtctaaag gagatattat tttctttcag 540

gatagcgatg atgtatgtca ccatgaaaga atcgaaagat gtgttaatgc attattatcg 600

aataaagata atatagctgt tagatgtgca tattctagaa taaatctaga aacacaaaat 660

ataataaaag ttaatgataa taaatacaaa ttaggattaa taactttagg cgtttataga 720

aaagtattta atgaaattgg ttttttaac tgcacaacca aagcatcgga tgatgaattt 780

tatcatagaa taattaaata ctatggtaaa aataggataa ataacttatt tctaccactg 840

tattataaca caatgcgtga agattcatta ttttctgata tggttgagtg ggtagatgaa 900

aataatataa agcaaaaaac ctctgatgct agacaaaatt atctccatga attccaaaaa 960

atacacaatg aaaggaaatt aaatgaatta aaagagattt ttagctttcc tagaattcat 1020

gacgccttac ctatatcaaa agaaatgagt aagctcagca accctaaaat tcctgtttat 1080

ataaatatat gctcaatacc ttcaagaata aaacaacttc aatacactat tggagtacta 1140

aaaaaccaat gcgatcattt tcatatttat cttgatggat atccagaagt acctgatttt 1200

ataaaaaaac tagggaataa agcgaccgtt attaattgtc aaaacaaaaa tgagtctatt 1260

agagataatg gaaagtttat tctattagaa aaacttataa aggaaaataa agatggatat 1320

tatataactt gtgatgatga tatccggtat cctgctgact acataaacac tatgataaaa 1380

aaaattaata aatacaatga taaagcagca attggattac atggtgttat attcccaagt 1440

agagtcaaca agtatttttc atcagacaga attgtctata attttcaaaa acctttagaa 1500

aatgatactg ctgtaaatat attaggaact ggaactgttg cctttagagt atctattttt 1560

aataaatttt ctctatctga ttttgagcat cctggcatgg tagatatcta tttttctata 1620

ctatgtaaga aaaacaatat actccaagtt tgtatatcac gaccatcgaa ttggctaaca 1680

gaagataaca aaaacactga gaccttattt catgaattcc aaaatagaga tgaaatacaa 1740

agtaaactca ttatttcaaa caacccttgg ggatactcaa gtatatatcc attattaaat 1800

aataatgcta attattctga acttattccg tgtttatctt tttataacga gtaa 1854

<210> 70
<211> 617
<212> PRT
<213> Pasteurella multocida

<400> 70

Met Ser Leu Phe Lys Arg Ala Thr Glu Leu Phe Lys Ser Gly Asn Tyr
1 5 10 15

Lys Asp Ala Leu Thr Leu Tyr Glu Asn Ile Ala Lys Ile Tyr Gly Ser
20 25 30

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Glu Ser Leu Val Lys Tyr Asn Ile Asp Ile Cys Lys Lys Asn Ile Thr
        35                  40                  45

Gln Ser Lys Ser Asn Lys Ile Glu Glu Asp Asn Ile Ser Gly Glu Asn
    50                  55                  60

Lys Phe Ser Val Ser Ile Lys Asp Leu Tyr Asn Glu Ile Ser Asn Ser
65                  70                  75                  80

Glu Leu Gly Ile Thr Lys Glu Arg Leu Gly Ala Pro Pro Leu Val Ser
                85                  90                  95

Ile Ile Met Thr Ser His Asn Thr Glu Lys Phe Ile Glu Ala Ser Ile
            100                 105                 110

Asn Ser Leu Leu Leu Gln Thr Tyr Asn Asn Leu Glu Val Ile Val Val
        115                 120                 125

Asp Asp Tyr Ser Thr Asp Lys Thr Phe Gln Ile Ala Ser Arg Ile Ala
    130                 135                 140

Asn Ser Thr Ser Lys Val Lys Thr Phe Arg Leu Asn Ser Asn Leu Gly
145                 150                 155                 160

Thr Tyr Phe Ala Lys Asn Thr Gly Ile Leu Lys Ser Lys Gly Asp Ile
                165                 170                 175

Ile Phe Phe Gln Asp Ser Asp Asp Val Cys His His Glu Arg Ile Glu
            180                 185                 190

Arg Cys Val Asn Ala Leu Leu Ser Asn Lys Asp Asn Ile Ala Val Arg
        195                 200                 205

Cys Ala Tyr Ser Arg Ile Asn Leu Glu Thr Gln Asn Ile Ile Lys Val
    210                 215                 220

Asn Asp Asn Lys Tyr Lys Leu Gly Leu Ile Thr Leu Gly Val Tyr Arg
225                 230                 235                 240

Lys Val Phe Asn Glu Ile Gly Phe Phe Asn Cys Thr Thr Lys Ala Ser
                245                 250                 255

Asp Asp Glu Phe Tyr His Arg Ile Ile Lys Tyr Tyr Gly Lys Asn Arg
            260                 265                 270

Ile Asn Asn Leu Phe Leu Pro Leu Tyr Tyr Asn Thr Met Arg Glu Asp
        275                 280                 285
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Ser Leu Phe Ser Asp Met Val Glu Trp Val Asp Glu Asn Asn Ile Lys
    290                 295                 300

Gln Lys Thr Ser Asp Ala Arg Gln Asn Tyr Leu His Glu Phe Gln Lys
305                 310                 315                 320

Ile His Asn Glu Arg Lys Leu Asn Glu Leu Lys Glu Ile Phe Ser Phe
                325                 330                 335

Pro Arg Ile His Asp Ala Leu Pro Ile Ser Lys Glu Met Ser Lys Leu
            340                 345                 350

Ser Asn Pro Lys Ile Pro Val Tyr Ile Asn Ile Cys Ser Ile Pro Ser
        355                 360                 365

Arg Ile Lys Gln Leu Gln Tyr Thr Ile Gly Val Leu Lys Asn Gln Cys
    370                 375                 380

Asp His Phe His Ile Tyr Leu Asp Gly Tyr Pro Glu Val Pro Asp Phe
385                 390                 395                 400

Ile Lys Lys Leu Gly Asn Lys Ala Thr Val Ile Asn Cys Gln Asn Lys
                405                 410                 415

Asn Glu Ser Ile Arg Asp Asn Gly Lys Phe Ile Leu Leu Glu Lys Leu
            420                 425                 430

Ile Lys Glu Asn Lys Asp Gly Tyr Tyr Ile Thr Cys Asp Asp Asp Ile
        435                 440                 445

Arg Tyr Pro Ala Asp Tyr Ile Asn Thr Met Ile Lys Lys Ile Asn Lys
    450                 455                 460

Tyr Asn Asp Lys Ala Ala Ile Gly Leu His Gly Val Ile Phe Pro Ser
465                 470                 475                 480

Arg Val Asn Lys Tyr Phe Ser Ser Asp Arg Ile Val Tyr Asn Phe Gln
                485                 490                 495

Lys Pro Leu Glu Asn Asp Thr Ala Val Asn Ile Leu Gly Thr Gly Thr
            500                 505                 510

Val Ala Phe Arg Val Ser Ile Phe Asn Lys Phe Ser Leu Ser Asp Phe
        515                 520                 525

Glu His Pro Gly Met Val Asp Ile Tyr Phe Ser Ile Leu Cys Lys Lys
    530                 535                 540
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Asn Asn Ile Leu Gln Val Cys Ile Ser Arg Pro Ser Asn Trp Leu Thr
545                 550                 555                 560

Glu Asp Asn Lys Asn Thr Glu Thr Leu Phe His Glu Phe Gln Asn Arg
                565                 570                 575

Asp Glu Ile Gln Ser Lys Leu Ile Ile Ser Asn Asn Pro Trp Gly Tyr
            580                 585                 590

Ser Ser Ile Tyr Pro Leu Leu Asn Asn Asn Ala Asn Tyr Ser Glu Leu
        595                 600                 605

Ile Pro Cys Leu Ser Phe Tyr Asn Glu
    610                 615
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<210> 71
<211> 2112
<212> DNA
<213> Pasteurella multocida

<400> 71
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aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat 180

aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt 240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg 300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca 360

aaagattttc ccaaagatct ggttttagcg cctttacctg atcatgttaa tgattttaca 420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt 480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta 540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa 600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa 660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat 720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat 780

gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat 840

acacaacata ttgacccaaa agacttctta ataacgcga gtttgcttga atcattacca 900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg 960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt 1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat 1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac 1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa 1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag 1260

gtcccttata tctatagaaa acttttacca atagaagatt cgcatatcaa tagagtacct 1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat 1380

agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tggttcaaca 1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg 1500

tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaaggt 1560

tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt 1620

ttaaaagaat ttttaaaaga taaaacgcta gcttgtgttt ataccactaa tagaaacgtc 1680

aatccggatg gtagcttaat cgctaatggt tacaattggc cagaattttc acgagaaaaa 1740

ctcacaacgg ctatgattgc tcaccacttt agaatgttca cgattagagc ttggcattta 1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatgtt cctcaaactc 1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt 1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat 1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat 2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta 2100

aaagatattt aa 2112

<210> 72
<211> 107
<212> PRT
<213> Pasteurella multocida

<400> 72

Ser Ile Ile Val Thr Thr Phe Asn Arg Pro Ala Ile Leu Ser Ile Thr
1 5 10 15

Leu Ala Cys Leu Val Asn Gln Lys Thr His Tyr Pro Phe Glu Val Ile
20 25 30

Val Thr Asp Asp Gly Ser Gln Glu Asp Leu Ser Pro Ile Ile Arg Gln
35 40 45

Tyr Glu Asn Lys Leu Asp Ile Arg Tyr Val Arg Gln Lys Asp Asn Gly
50 55 60

Phe Gln Ala Ser Ala Ala Arg Asn Met Gly Leu Arg Leu Ala Lys Tyr
65 70 75 80

Asp Phe Ile Gly Leu Leu Asp Cys Asp Met Ala Pro Asn Pro Leu Trp
85 90 95

Val His Ser Tyr Val Ala Glu Leu Leu Glu Asp
100 105

<210> 73
<211> 105
<212> PRT
<213> Pasteurella multocida

<400> 73

Ser Ile Tyr Ile Pro Ala Tyr Asn Cys Ala Asn Tyr Ile Gln Arg Cys
1 5 10 15

Val Asp Ser Ala Leu Asn Gln Thr Thr Val Asp Leu Glu Val Cys Ile
20 25 30

Cys Asn Asp Gly Ser Thr Asp Asn Thr Leu Glu Val Ile Asn Lys Leu
35 40 45

Tyr Gly Asn Asn Pro Arg Val Arg Ile Met Ser Lys Pro Asn Gly Gly
50 55 60

Ile Ala Ser Ala Ser Asn Ala Ala Val Ser Phe Ala Lys Gly Tyr Tyr
65 70 75 80

Ile Gly Gln Leu Asp Ser Asp Asp Tyr Leu Glu Pro Asp Ala Val Glu
85 90 95

Leu Cys Leu Lys Glu Phe Leu Lys Asp
100 105

<210> 74
<211> 771
<212> PRT
<213> Pasteurella multocida

<400> 74

Met Asn Thr Leu Ser Gln Ala Ile Lys Ala Tyr Asn Ser Asn Asp Tyr
1 5 10 15

Gln Leu Ala Leu Lys Leu Phe Glu Lys Ser Ala Glu Ile Tyr Gly Arg
20 25 30

Lys Ile Val Glu Phe Gln Ile Thr Lys Cys Lys Glu Lys Leu Ser Ala
35 40 45

His Pro Ser Val Asn Ser Ala His Leu Ser Val Asn Lys Glu Glu Lys
50 55 60

```
Val Asn Val Cys Asp Ser Pro Leu Asp Ile Ala Thr Gln Leu Leu Leu
65                  70                  75                  80

Ser Asn Val Lys Lys Leu Val Leu Ser Asp Ser Glu Lys Asn Thr Leu
                85                  90                  95

Lys Asn Lys Trp Lys Leu Leu Thr Glu Lys Lys Ser Glu Asn Ala Glu
            100                 105                 110

Val Arg Ala Val Ala Leu Val Pro Lys Asp Phe Pro Lys Asp Leu Val
        115                 120                 125

Leu Ala Pro Leu Pro Asp His Val Asn Asp Phe Thr Trp Tyr Lys Lys
    130                 135                 140

Arg Lys Lys Arg Leu Gly Ile Lys Pro Glu His Gln His Val Gly Leu
145                 150                 155                 160

Ser Ile Ile Val Thr Thr Phe Asn Arg Pro Ala Ile Leu Ser Ile Thr
                165                 170                 175

Leu Ala Cys Leu Val Asn Gln Lys Thr His Tyr Pro Phe Glu Val Ile
            180                 185                 190

Val Thr Asp Asp Gly Ser Gln Glu Asp Leu Ser Pro Ile Ile Arg Gln
        195                 200                 205

Tyr Glu Asn Lys Leu Asp Ile Arg Tyr Val Arg Gln Lys Asp Asn Gly
    210                 215                 220

Phe Gln Ala Ser Ala Ala Arg Asn Met Gly Leu Arg Leu Ala Lys Tyr
225                 230                 235                 240

Asp Phe Ile Gly Leu Leu Asp Cys Asp Met Ala Pro Asn Pro Leu Trp
                245                 250                 255

Val His Ser Tyr Val Ala Glu Leu Leu Val Gln Lys Tyr Glu Gln Lys
            260                 265                 270

Leu Asp Ile Lys Tyr Val Arg Gln Lys Asp Tyr Gly Tyr Gln Leu Cys
        275                 280                 285

Ala Val Arg Asn Leu Gly Leu Arg Thr Ala Lys Tyr Asp Phe Val Ser
    290                 295                 300

Ile Leu Asp Cys Asp Met Ala Pro Gln Gln Leu Trp Val His Ser Tyr
305                 310                 315                 320
```

```
Leu Thr Glu Leu Leu Glu Asp Asn Asp Ile Val Leu Ile Gly Pro Arg
                325                 330                 335

Lys Tyr Val Asp Thr His Asn Ile Thr Ala Glu Gln Phe Leu Asn Asp
            340                 345                 350

Pro Tyr Leu Ile Glu Ser Leu Pro Glu Thr Ala Thr Asn Asn Asn Pro
        355                 360                 365

Ser Ile Thr Ser Lys Gly Asn Ile Ser Leu Asp Trp Arg Leu Glu His
    370                 375                 380

Phe Lys Lys Thr Asp Asn Leu Arg Leu Cys Asp Ser Pro Phe Arg Tyr
385                 390                 395                 400

Phe Ser Cys Gly Asn Val Ala Phe Ser Lys Glu Trp Leu Asn Lys Val
                405                 410                 415

Gly Trp Phe Asp Glu Glu Phe Asn His Trp Gly Gly Glu Asp Val Glu
            420                 425                 430

Phe Gly Tyr Arg Leu Phe Ala Lys Gly Cys Phe Phe Arg Val Ile Asp
        435                 440                 445

Gly Gly Met Ala Tyr His Gln Glu Pro Pro Gly Lys Glu Asn Glu Thr
    450                 455                 460

Asp Arg Glu Ala Gly Lys Ser Ile Thr Leu Lys Ile Val Lys Glu Lys
465                 470                 475                 480

Val Pro Tyr Ile Tyr Arg Lys Leu Leu Pro Ile Glu Asp Ser His Ile
                485                 490                 495

His Arg Ile Pro Leu Val Ser Ile Tyr Ile Pro Ala Tyr Asn Cys Ala
            500                 505                 510

Asn Tyr Ile Gln Arg Cys Val Asp Ser Ala Leu Asn Gln Thr Val Val
        515                 520                 525

Asp Leu Glu Val Cys Ile Cys Asn Asp Gly Ser Thr Asp Asn Thr Leu
    530                 535                 540

Glu Val Ile Asn Lys Leu Tyr Gly Asn Asn Pro Arg Val Arg Ile Met
545                 550                 555                 560

Ser Lys Pro Asn Gly Gly Ile Ala Ser Ala Ser Asn Ala Ala Val Ser
                565                 570                 575
```

```
Phe Ala Lys Gly Tyr Tyr Ile Gly Gln Leu Asp Ser Asp Asp Tyr Leu
            580                 585                 590

Glu Pro Asp Ala Val Glu Leu Cys Leu Lys Glu Phe Leu Lys Asp Lys
        595                 600                 605

Thr Leu Ala Cys Val Tyr Thr Thr Asn Arg Asn Val Asn Pro Asp Gly
    610                 615                 620

Ser Leu Ile Ala Asn Gly Tyr Asn Trp Pro Glu Phe Ser Arg Glu Lys
625                 630                 635                 640

Leu Thr Thr Ala Met Ile Ala His His Phe Arg Met Phe Thr Ile Arg
                645                 650                 655

Ala Trp His Leu Thr Asp Gly Phe Asn Glu Asn Ile Glu Asn Ala Val
            660                 665                 670

Asp Tyr Asp Met Phe Leu Lys Leu Ser Glu Val Gly Lys Phe Lys His
        675                 680                 685

Leu Asn Lys Ile Cys Tyr Asn Arg Val Leu His Gly Asp Asn Thr Ser
    690                 695                 700

Ile Lys Lys Leu Gly Ile Gln Lys Lys Asn His Phe Val Val Val Asn
705                 710                 715                 720

Gln Ser Leu Asn Arg Gln Gly Ile Asn Tyr Tyr Asn Tyr Asp Lys Phe
                725                 730                 735

Asp Asp Leu Asp Glu Ser Arg Lys Tyr Ile Phe Asn Lys Thr Ala Glu
            740                 745                 750

Tyr Gln Glu Glu Met Asp Ile Leu Lys Asp Leu Lys Leu Ile Gln Asn
        755                 760                 765

Lys Asp Ala
    770
```

<210> 75
<211> 696
<212> PRT
<213> Pasteurella multocida

<400> 75

```
Met Asn Thr Leu Ser Gln Ala Ile Lys Ala Tyr Asn Ser Asn Asp Tyr
1               5                   10                  15
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```
Glu Leu Ala Leu Lys Leu Phe Glu Lys Ser Ala Glu Thr Tyr Gly Arg
            20                  25                  30

Lys Ile Val Glu Phe Gln Ile Ile Lys Cys Lys Glu Lys Leu Ser Thr
        35                  40                  45

Asn Ser Tyr Val Ser Glu Asp Lys Lys Asn Ser Val Cys Asp Ser Ser
    50                  55                  60

Leu Asp Ile Ala Thr Gln Leu Leu Leu Ser Asn Val Lys Lys Leu Thr
65                  70                  75                  80

Leu Ser Glu Ser Glu Lys Asn Ser Leu Lys Asn Lys Trp Lys Ser Ile
                85                  90                  95

Thr Gly Lys Lys Ser Glu Asn Ala Glu Ile Arg Lys Val Glu Leu Val
            100                 105                 110

Pro Lys Asp Phe Pro Lys Asp Leu Val Leu Ala Pro Leu Pro Asp His
        115                 120                 125

Val Asn Asp Phe Thr Trp Tyr Lys Asn Arg Lys Lys Ser Leu Gly Ile
    130                 135                 140

Lys Pro Val Asn Lys Asn Ile Gly Leu Ser Ile Ile Ile Pro Thr Phe
145                 150                 155                 160

Asn Arg Ser Arg Ile Leu Asp Ile Thr Leu Ala Cys Leu Val Asn Gln
                165                 170                 175

Lys Thr Asn Tyr Pro Phe Glu Val Val Val Ala Asp Asp Gly Ser Lys
            180                 185                 190

Glu Asn Leu Leu Thr Ile Ile Arg Gln Tyr Glu Asn Lys Leu Asp Ile
        195                 200                 205

Arg Tyr Val Arg Gln Lys Asp Asn Gly Phe Gln Ala Ser Ala Ala Arg
    210                 215                 220

Asn Met Gly Leu Arg Leu Ala Lys Tyr Asp Phe Ile Gly Leu Leu Asp
225                 230                 235                 240

Cys Asp Met Ala Pro Asn Pro Leu Trp Val His Ser Tyr Val Ala Glu
                245                 250                 255

Leu Leu Glu Asp Asp Asp Leu Thr Ile Ile Gly Pro Arg Lys Tyr Ile
            260                 265                 270
```

```
Asp Thr Gln His Ile Asp Pro Lys Asp Phe Leu Asn Asn Ala Ser Leu
        275                 280                 285

Leu Glu Ser Leu Pro Glu Val Lys Thr Asn Asn Ser Val Ala Ala Lys
    290                 295                 300

Gly Glu Gly Thr Val Ser Leu Asp Trp Arg Leu Glu Gln Phe Glu Lys
305                 310                 315                 320

Thr Glu Asn Leu Arg Leu Ser Asp Ser Pro Phe Arg Phe Phe Ala Ala
                325                 330                 335

Gly Asn Val Ala Phe Ala Lys Lys Trp Leu Asn Lys Ser Gly Phe Phe
            340                 345                 350

Asp Glu Glu Phe Asn His Trp Gly Gly Glu Asp Val Glu Phe Gly Tyr
        355                 360                 365

Arg Leu Phe Arg Tyr Gly Ser Phe Phe Lys Thr Ile Asp Gly Ile Met
    370                 375                 380

Ala Tyr His Gln Glu Pro Pro Gly Lys Glu Asn Glu Thr Asp Arg Glu
385                 390                 395                 400

Ala Gly Lys Asn Ile Thr Leu Asp Ile Met Arg Glu Lys Val Pro Tyr
                405                 410                 415

Ile Tyr Arg Lys Leu Leu Pro Ile Glu Asp Ser His Ile Asn Arg Val
            420                 425                 430

Pro Leu Val Ser Ile Tyr Ile Pro Ala Tyr Asn Cys Ala Asn Tyr Ile
        435                 440                 445

Gln Arg Cys Val Asp Ser Ala Leu Asn Gln Thr Val Val Asp Leu Glu
    450                 455                 460

Val Cys Ile Cys Asn Asp Gly Ser Thr Asp Asn Thr Leu Glu Val Ile
465                 470                 475                 480

Asn Lys Leu Tyr Gly Asn Asn Pro Arg Val Arg Ile Met Ser Lys Pro
                485                 490                 495

Asn Gly Gly Ile Ala Ser Ala Ser Asn Ala Ala Val Ser Phe Ala Lys
            500                 505                 510

Gly Tyr Tyr Ile Gly Gln Leu Asp Ser Asp Asp Tyr Leu Glu Pro Asp
        515                 520                 525
```

Ala Val Glu Leu Cys Leu Lys Glu Phe Leu Lys Asp Lys Thr Leu Ala
530 535 540

Cys Val Tyr Thr Thr Asn Arg Asn Val Asn Pro Asp Gly Ser Leu Ile
545 550 555 560

Ala Asn Gly Tyr Asn Trp Pro Glu Phe Ser Arg Glu Lys Leu Thr Thr
565 570 575

Ala Met Ile Ala His His Phe Arg Met Phe Thr Ile Arg Ala Trp His
580 585 590

Leu Thr Asp Gly Phe Asn Glu Lys Ile Glu Asn Ala Val Asp Tyr Asp
595 600 605

Met Phe Leu Lys Leu Ser Glu Val Gly Lys Phe Lys His Leu Asn Lys
610 615 620

Ile Cys Tyr Asn Arg Val Leu His Gly Asp Asn Thr Ser Ile Lys Lys
625 630 635 640

Leu Gly Ile Gln Lys Lys Asn His Phe Val Val Val Asn Gln Ser Leu
645 650 655

Asn Arg Gln Gly Ile Thr Tyr Tyr Asn Tyr Asp Glu Phe Asp Asp Leu
660 665 670

Asp Glu Ser Arg Lys Tyr Ile Phe Asn Lys Thr Ala Glu Tyr Gln Glu
675 680 685

Glu Ile Asp Ile Leu Lys Asp Ile
690 695

<210> 76
<211> 711
<212> PRT
<213> Pasteurella multocida

<400> 76

Met Asn Thr Leu Ser Gln Ala Ile Lys Ala Tyr Asn Ser Asn Asp Tyr
1 5 10 15

Gln Leu Ala Leu Lys Leu Phe Glu Lys Ser Ala Glu Ile Tyr Gly Arg
20 25 30

Lys Ile Val Glu Phe Gln Ile Thr Lys Cys Lys Glu Lys Leu Ser Ala
35 40 45

```
His Pro Ser Val Asn Ser Ala His Leu Ser Val Asn Lys Glu Glu Lys
    50                  55                  60

Val Asn Val Cys Asp Ser Pro Leu Asp Ile Ala Thr Gln Leu Leu Leu
65                  70                  75                  80

Ser Asn Val Lys Lys Leu Val Leu Ser Asp Ser Glu Lys Asn Thr Leu
                85                  90                  95

Lys Asn Lys Trp Lys Leu Leu Thr Glu Lys Lys Ser Glu Asn Ala Glu
            100                 105                 110

Val Arg Ala Val Ala Leu Val Pro Lys Asp Phe Pro Lys Asp Leu Val
        115                 120                 125

Leu Ala Pro Leu Pro Asp His Val Asn Asp Phe Thr Trp Tyr Lys Lys
    130                 135                 140

Arg Lys Lys Arg Leu Gly Ile Lys Pro Glu His Gln His Val Gly Leu
145                 150                 155                 160

Ser Ile Ile Val Thr Thr Phe Asn Arg Pro Ala Ile Leu Ser Ile Thr
                165                 170                 175

Leu Ala Cys Leu Val Asn Gln Lys Thr His Tyr Pro Phe Glu Val Ile
            180                 185                 190

Val Thr Asp Asp Gly Ser Gln Glu Asp Leu Ser Pro Ile Ile Arg Gln
        195                 200                 205

Tyr Glu Asn Lys Leu Asp Ile Arg Tyr Val Arg Gln Lys Asp Tyr Gly
    210                 215                 220

Tyr Gln Leu Cys Ala Val Arg Asn Leu Gly Leu Arg Thr Ala Lys Tyr
225                 230                 235                 240

Asp Phe Val Ser Ile Leu Asp Cys Asp Met Ala Pro Gln Gln Leu Trp
                245                 250                 255

Val His Ser Tyr Leu Thr Glu Leu Leu Glu Asp Asn Asp Ile Val Leu
            260                 265                 270

Ile Gly Pro Arg Lys Tyr Val Asp Thr His Asn Ile Thr Ala Glu Gln
        275                 280                 285

Phe Leu Asn Asp Pro Tyr Leu Ile Glu Ser Leu Pro Glu Thr Ala Thr
    290                 295                 300
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Asn Asn Asn Pro Ser Ile Thr Ser Lys Gly Asn Ile Ser Leu Asp Trp
305                 310                 315                 320

Arg Leu Glu His Phe Lys Lys Thr Asp Asn Leu Arg Leu Cys Asp Ser
                325                 330                 335

Pro Phe Arg Tyr Phe Ser Cys Gly Asn Val Ala Phe Ser Lys Glu Trp
            340                 345                 350

Leu Asn Lys Val Gly Trp Phe Asp Glu Glu Phe Asn His Trp Gly Gly
        355                 360                 365

Glu Asp Val Glu Phe Gly Tyr Arg Leu Phe Ala Lys Gly Cys Phe Phe
    370                 375                 380

Arg Val Ile Asp Gly Gly Met Ala Tyr His Gln Glu Pro Pro Gly Lys
385                 390                 395                 400

Glu Asn Glu Thr Asp Arg Glu Ala Gly Lys Ser Ile Thr Leu Lys Ile
                405                 410                 415

Val Lys Glu Lys Val Pro Tyr Ile Tyr Arg Lys Leu Leu Pro Ile Glu
            420                 425                 430

Asp Ser His Ile His Arg Ile Pro Leu Val Ser Ile Tyr Ile Pro Ala
        435                 440                 445

Tyr Asn Cys Ala Asn Tyr Ile Gln Arg Cys Val Asp Ser Ala Leu Asn
    450                 455                 460

Gln Thr Val Val Asp Leu Glu Val Cys Ile Cys Asn Asp Gly Ser Thr
465                 470                 475                 480

Asp Asn Thr Leu Glu Val Ile Asn Lys Leu Tyr Gly Asn Asn Pro Arg
                485                 490                 495

Val Arg Ile Met Ser Lys Pro Asn Gly Gly Ile Ala Ser Ala Ser Asn
            500                 505                 510

Ala Ala Val Ser Phe Ala Lys Gly Tyr Tyr Ile Gly Gln Leu Asp Ser
        515                 520                 525

Asp Asp Tyr Leu Glu Pro Asp Ala Val Glu Leu Cys Leu Lys Glu Phe
    530                 535                 540

Leu Lys Asp Lys Thr Leu Ala Cys Val Tyr Thr Thr Asn Arg Asn Val
545                 550                 555                 560
```

Asn Pro Asp Gly Ser Leu Ile Ala Asn Gly Tyr Asn Trp Pro Glu Phe
565 570 575

Ser Arg Glu Lys Leu Thr Thr Ala Met Ile Ala His His Phe Arg Met
580 585 590

Phe Thr Ile Arg Ala Trp His Leu Thr Asp Gly Phe Asn Glu Asn Ile
595 600 605

Glu Asn Ala Val Asp Tyr Asp Met Phe Leu Lys Leu Ser Glu Val Gly
610 615 620

Lys Phe Lys His Leu Asn Lys Ile Cys Tyr Asn Arg Val Leu His Gly
625 630 635 640

Asp Asn Thr Ser Ile Lys Lys Leu Gly Ile Gln Lys Lys Asn His Phe
645 650 655

Val Val Val Asn Gln Ser Leu Asn Arg Gln Gly Ile Asn Tyr Tyr Asn
660 665 670

Tyr Asp Lys Phe Asp Asp Leu Asp Glu Ser Arg Lys Tyr Ile Phe Asn
675 680 685

Lys Thr Ala Glu Tyr Gln Glu Glu Met Asp Ile Leu Lys Asp Leu Lys
690 695 700

Leu Ile Gln Asn Lys Asp Ala
705 710

<210> 77
<211> 696
<212> PRT
<213> Pasteurella multocida

<400> 77

Met Asn Thr Leu Ser Gln Ala Ile Lys Ala Tyr Asn Ser Asn Asp Tyr
1 5 10 15

Glu Leu Ala Leu Lys Leu Phe Glu Lys Ser Ala Glu Thr Tyr Gly Arg
20 25 30

Lys Ile Val Glu Phe Gln Ile Ile Lys Cys Lys Glu Lys Leu Ser Thr
35 40 45

Asn Ser Tyr Val Ser Glu Asp Lys Lys Asn Ser Val Cys Asp Ser Ser
50 55 60

Leu Asp Ile Ala Thr Gln Leu Leu Leu Ser Asn Val Lys Lys Leu Thr

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65                  70                  75                  80

Leu Ser Glu Ser Glu Lys Asn Ser Leu Lys Asn Lys Trp Lys Ser Ile
                85                  90                  95

Thr Gly Lys Lys Ser Glu Asn Ala Glu Ile Arg Lys Val Glu Leu Val
            100                 105                 110

Pro Lys Asp Phe Pro Lys Asp Leu Val Leu Ala Pro Leu Pro Asp His
        115                 120                 125

Val Asn Asp Phe Thr Trp Tyr Lys Asn Arg Lys Lys Ser Leu Gly Ile
    130                 135                 140

Lys Pro Val Asn Lys Asn Ile Gly Leu Ser Ile Ile Ile Pro Thr Phe
145                 150                 155                 160

Asn Arg Ser Arg Ile Leu Asp Ile Thr Leu Ala Cys Leu Val Asn Gln
                165                 170                 175

Lys Thr Asn Tyr Pro Phe Glu Val Val Val Ala Asp Asp Gly Ser Lys
            180                 185                 190

Glu Asn Leu Leu Thr Ile Val Gln Lys Tyr Glu Gln Lys Leu Asp Ile
        195                 200                 205

Lys Tyr Val Arg Gln Lys Asp Asn Gly Phe Gln Ala Ser Ala Ala Arg
    210                 215                 220

Asn Met Gly Leu Arg Leu Ala Lys Tyr Asp Phe Ile Gly Leu Leu Asp
225                 230                 235                 240

Cys Asp Met Ala Pro Asn Pro Leu Trp Val His Ser Tyr Val Ala Glu
                245                 250                 255

Leu Leu Glu Asp Asp Asp Leu Thr Ile Ile Gly Pro Arg Lys Tyr Ile
            260                 265                 270

Asp Thr Gln His Ile Asp Pro Lys Asp Phe Leu Asn Asn Ala Ser Leu
        275                 280                 285

Leu Glu Ser Leu Pro Glu Val Lys Thr Asn Asn Ser Val Ala Ala Lys
    290                 295                 300

Gly Glu Gly Thr Val Ser Leu Asp Trp Arg Leu Glu Gln Phe Glu Lys
305                 310                 315                 320

Thr Glu Asn Leu Arg Leu Ser Asp Ser Pro Phe Arg Phe Phe Ala Ala
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```
                325                 330                 335

Gly Asn Val Ala Phe Ala Lys Lys Trp Leu Asn Lys Ser Gly Phe Phe
            340                 345                 350

Asp Glu Glu Phe Asn His Trp Gly Gly Glu Asp Val Glu Phe Gly Tyr
        355                 360                 365

Arg Leu Phe Arg Tyr Gly Ser Phe Phe Lys Thr Ile Asp Gly Ile Met
    370                 375                 380

Ala Tyr His Gln Glu Pro Pro Gly Lys Glu Asn Glu Thr Asp Arg Glu
385                 390                 395                 400

Ala Gly Lys Asn Ile Thr Leu Asp Ile Met Arg Glu Lys Val Pro Tyr
                405                 410                 415

Ile Tyr Arg Lys Leu Leu Pro Ile Glu Asp Ser His Ile Asn Arg Val
            420                 425                 430

Pro Leu Val Ser Ile Tyr Ile Pro Ala Tyr Asn Cys Ala Asn Tyr Ile
        435                 440                 445

Gln Arg Cys Val Asp Ser Ala Leu Asn Gln Thr Val Val Asp Leu Glu
    450                 455                 460

Val Cys Ile Cys Asn Asp Gly Ser Thr Asp Asn Thr Leu Glu Val Ile
465                 470                 475                 480

Asn Lys Leu Tyr Gly Asn Asn Pro Arg Val Arg Ile Met Ser Lys Pro
                485                 490                 495

Asn Gly Gly Ile Ala Ser Ala Ser Asn Ala Ala Val Ser Phe Ala Lys
            500                 505                 510

Gly Tyr Tyr Ile Gly Gln Leu Asp Ser Asp Asp Tyr Leu Glu Pro Asp
        515                 520                 525

Ala Val Glu Leu Cys Leu Lys Glu Phe Leu Lys Asp Lys Thr Leu Ala
    530                 535                 540

Cys Val Tyr Thr Thr Asn Arg Asn Val Asn Pro Asp Gly Ser Leu Ile
545                 550                 555                 560

Ala Asn Gly Tyr Asn Trp Pro Glu Phe Ser Arg Glu Lys Leu Thr Thr
                565                 570                 575

Ala Met Ile Ala His His Phe Arg Met Phe Thr Ile Arg Ala Trp His
```

580 585 590

Leu Thr Asp Gly Phe Asn Glu Lys Ile Glu Asn Ala Val Asp Tyr Asp
595 600 605

Met Phe Leu Lys Leu Ser Glu Val Gly Lys Phe Lys His Leu Asn Lys
610 615 620

Ile Cys Tyr Asn Arg Val Leu His Gly Asp Asn Thr Ser Ile Lys Lys
625 630 635 640

Leu Gly Ile Gln Lys Lys Asn His Phe Val Val Val Asn Gln Ser Leu
645 650 655

Asn Arg Gln Gly Ile Thr Tyr Tyr Asn Tyr Asp Glu Phe Asp Asp Leu
660 665 670

Asp Glu Ser Arg Lys Tyr Ile Phe Asn Lys Thr Ala Glu Tyr Gln Glu
675 680 685

Glu Ile Asp Ile Leu Lys Asp Ile
690 695

<210> 78
<211> 40
<212> PRT
<213> Pasteurella multocida

<400> 78

Asn Lys Leu Asp Ile Arg Tyr Val Arg Gln Lys Asp Asn Gly Phe Gln
1 5 10 15

Ala Ser Ala Ala Arg Asn Met Gly Leu Arg Leu Ala Lys Tyr Asp Phe
20 25 30

Ile Gly Leu Leu Asp Cys Asp Met
35 40

<210> 79
<211> 40
<212> PRT
<213> Pasteurella multocida

<400> 79

Gln Lys Leu Asp Ile Lys Tyr Val Arg Gln Lys Asp Tyr Gly Tyr Gln
1 5 10 15

Leu Cys Ala Val Arg Asn Leu Gly Leu Arg Thr Ala Lys Tyr Asp Phe
20 25 30

Val Ser Ile Leu Asp Cys Asp Met
35 40

<210> 80
<211> 40
<212> PRT
<213> Meleagris gallopavo

<400> 80

Glu Lys Leu Asp Ile Lys Tyr Val Arg Gln Lys Asp Tyr Gly Tyr Gln
1 5 10 15

Leu Cys Ala Val Arg Asn Leu Gly Leu Arg Thr Ala Lys Tyr Asp Phe
20 25 30

Val Ser Ile Leu Asp Cys Asp Met
35 40

<210> 81
<211> 36
<212> PRT
<213> Goose

<400> 81

Val Asp Ile Lys Tyr Val Arg Gln Lys Asp Tyr Gly Tyr Gln Leu Cys
1 5 10 15

Ala Val Arg Asn Leu Gly Leu Arg Thr Ala Lys Tyr Asp Phe Val Ser
20 25 30

Ile Leu Asp Cys
35

<210> 82
<211> 33
<212> PRT
<213> sea lion

<400> 82

Lys Tyr Val Arg Gln Lys Asp Tyr Gly Tyr Gln Leu Cys Ala Val Arg
1 5 10 15

Asn Leu Gly Leu Arg Thr Ala Lys Tyr Asp Phe Val Ser Ile Leu Asp
20 25 30

Cys

<210> 83
<211> 35

<212> PRT
<213> Artificial sequence

<220>
<223> Consensus of SEQ ID NOS:78-82

<220>
<221> misc_feature
<222> (12)..(12)
<223> Xaa can be any naturally occurring amino acid

<220>
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<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (30)..(30)
<223> Xaa can be any naturally occurring amino acid

<400> 83

Asp Ile Lys Tyr Val Arg Gln Lys Asp Tyr Gly Xaa Gln Leu Cys Ala
1 5 10 15

Val Arg Asn Xaa Gly Leu Arg Thr Ala Lys Tyr Asp Phe Xaa Ser Ile
20 25 30

Leu Asp Cys
35

<210> 84
<211> 703
<212> PRT
<213> Pasteurella multocida

<400> 84

Met Asn Thr Leu Ser Gln Ala Ile Lys Ala Tyr Asn Ser Asn Asp Tyr
1 5 10 15

Gln Leu Ala Leu Lys Leu Phe Glu Lys Ser Ala Glu Ile Tyr Gly Arg
20 25 30

Lys Ile Val Glu Phe Gln Ile Thr Lys Cys Lys Glu Lys Leu Ser Ala
35 40 45

His Pro Ser Val Asn Ser Ala His Leu Ser Val Asn Lys Glu Glu Lys
50 55 60

Val Asn Val Cys Asp Ser Pro Leu Asp Ile Ala Thr Gln Leu Leu Leu
65 70 75 80

Ser Asn Val Lys Lys Leu Val Leu Ser Asp Ser Glu Lys Asn Thr Leu

85 90 95

Lys Asn Lys Trp Lys Leu Leu Thr Glu Lys Lys Ser Glu Asn Ala Glu
100 105 110

Val Arg Ala Val Ala Leu Val Pro Lys Asp Phe Pro Lys Asp Leu Val
115 120 125

Leu Ala Pro Leu Pro Asp His Val Asn Asp Phe Thr Trp Tyr Lys Lys
130 135 140

Arg Lys Lys Arg Leu Gly Ile Lys Pro Glu His Gln His Val Gly Leu
145 150 155 160

Ser Ile Ile Val Thr Thr Phe Asn Arg Pro Ala Ile Leu Ser Ile Thr
165 170 175

Leu Ala Cys Leu Val Asn Gln Lys Thr His Tyr Pro Phe Glu Val Ile
180 185 190

Val Thr Asp Asp Gly Ser Gln Glu Asp Leu Ser Pro Ile Ile Arg Gln
195 200 205

Tyr Glu Asn Lys Leu Asp Ile Arg Tyr Val Arg Gln Lys Asp Tyr Gly
210 215 220

Tyr Gln Leu Cys Ala Val Arg Asn Leu Gly Leu Arg Thr Ala Lys Tyr
225 230 235 240

Asp Phe Val Ser Ile Leu Asp Cys Asp Met Ala Pro Gln Gln Leu Trp
245 250 255

Val His Ser Tyr Leu Thr Glu Leu Leu Glu Asp Asp Asp Leu Thr Ile
260 265 270

Ile Gly Pro Arg Lys Tyr Ile Asp Thr Gln His Ile Asp Pro Lys Asp
275 280 285

Phe Leu Asn Asn Ala Ser Leu Leu Glu Ser Leu Pro Glu Val Lys Thr
290 295 300

Asn Asn Ser Val Ala Ala Lys Gly Glu Gly Thr Val Ser Leu Asp Trp
305 310 315 320

Arg Leu Glu Gln Phe Glu Lys Thr Glu Asn Leu Arg Leu Ser Asp Ser
325 330 335

Pro Phe Arg Phe Phe Ala Ala Gly Asn Val Ala Phe Ala Lys Lys Trp

340 345 350

Leu Asn Lys Ser Gly Phe Phe Asp Glu Glu Phe Asn His Trp Gly Gly
355 360 365

Glu Asp Val Glu Phe Gly Tyr Arg Leu Phe Arg Tyr Gly Ser Phe Phe
370 375 380

Lys Thr Ile Asp Gly Ile Met Ala Tyr His Gln Glu Pro Pro Gly Lys
385 390 395 400

Glu Asn Glu Thr Asp Arg Glu Ala Gly Lys Asn Ile Thr Leu Asp Ile
405 410 415

Met Arg Glu Lys Val Pro Tyr Ile Tyr Arg Lys Leu Leu Pro Ile Glu
420 425 430

Asp Ser His Ile Asn Arg Val Pro Leu Val Ser Ile Tyr Ile Pro Ala
435 440 445

Tyr Asn Cys Ala Asn Tyr Ile Gln Arg Cys Val Asp Ser Ala Leu Asn
450 455 460

Gln Thr Val Val Asp Leu Glu Val Cys Ile Cys Asn Asp Gly Ser Thr
465 470 475 480

Asp Asn Thr Leu Glu Val Ile Asn Lys Leu Tyr Gly Asn Asn Pro Arg
485 490 495

Val Arg Ile Met Ser Lys Pro Asn Gly Gly Ile Ala Ser Ala Ser Asn
500 505 510

Ala Ala Val Ser Phe Ala Lys Gly Tyr Tyr Ile Gly Gln Leu Asp Ser
515 520 525

Asp Asp Tyr Leu Glu Pro Asp Ala Val Glu Leu Cys Leu Lys Glu Phe
530 535 540

Leu Lys Asp Lys Thr Leu Ala Cys Val Tyr Thr Thr Asn Arg Asn Val
545 550 555 560

Asn Pro Asp Gly Ser Leu Ile Ala Asn Gly Tyr Asn Trp Pro Glu Phe
565 570 575

Ser Arg Glu Lys Leu Thr Thr Ala Met Ile Ala His His Phe Arg Met
580 585 590

Phe Thr Ile Arg Ala Trp His Leu Thr Asp Gly Phe Asn Glu Lys Ile

595 600 605

Glu Asn Ala Val Asp Tyr Asp Met Phe Leu Lys Leu Ser Glu Val Gly
610 615 620

Lys Phe Lys His Leu Asn Lys Ile Cys Tyr Asn Arg Val Leu His Gly
625 630 635 640

Asp Asn Thr Ser Ile Lys Lys Leu Gly Ile Gln Lys Lys Asn His Phe
645 650 655

Val Val Val Asn Gln Ser Leu Asn Arg Gln Gly Ile Thr Tyr Tyr Asn
660 665 670

Tyr Asp Glu Phe Asp Asp Leu Asp Glu Ser Arg Lys Tyr Ile Phe Asn
675 680 685

Lys Thr Ala Glu Tyr Gln Glu Glu Ile Asp Ile Leu Lys Asp Ile
690 695 700

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<211> 705
<212> PRT
<213> Pasteurella multocida

<400> 85

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Glu Leu Ala Leu Lys Leu Phe Glu Lys Ser Ala Glu Thr Tyr Gly Arg
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Lys Ile Val Glu Phe Gln Ile Ile Lys Cys Lys Glu Lys Leu Ser Thr
35 40 45

Asn Ser Tyr Val Ser Glu Asp Lys Lys Asn Ser Val Cys Asp Ser Ser
50 55 60

Leu Asp Ile Ala Thr Gln Leu Leu Leu Ser Asn Val Lys Lys Leu Thr
65 70 75 80

Leu Ser Glu Ser Glu Lys Asn Ser Leu Lys Asn Lys Trp Lys Ser Ile
85 90 95

Thr Gly Lys Lys Ser Glu Asn Ala Glu Ile Arg Lys Val Glu Leu Val
100 105 110

Pro Lys Asp Phe Pro Lys Asp Leu Val Leu Ala Pro Leu Pro Asp His
115 120 125

Val Asn Asp Phe Thr Trp Tyr Lys Asn Arg Lys Lys Ser Leu Gly Ile
130 135 140

Lys Pro Val Asn Lys Asn Ile Gly Leu Ser Ile Ile Ile Pro Thr Phe
145 150 155 160

Asn Arg Ser Arg Ile Leu Asp Ile Thr Leu Ala Cys Leu Val Asn Gln
165 170 175

Lys Thr Asn Tyr Pro Phe Glu Val Val Val Ala Asp Asp Gly Ser Lys
180 185 190

Glu Asn Leu Leu Thr Ile Val Gln Lys Tyr Glu Gln Lys Leu Asp Ile
195 200 205

Lys Tyr Val Arg Gln Lys Asp Asn Gly Phe Gln Ala Ser Ala Ala Arg
210 215 220

Asn Met Gly Leu Arg Leu Ala Lys Tyr Asp Phe Ile Gly Leu Leu Asp
225 230 235 240

Cys Asp Met Ala Pro Asn Pro Leu Trp Val His Ser Tyr Val Ala Glu
245 250 255

Leu Leu Leu Glu Asp Asn Asp Ile Val Leu Ile Gly Pro Arg Lys Tyr
260 265 270

Val Asp Thr His Asn Ile Thr Ala Glu Gln Phe Leu Asn Asp Pro Tyr
275 280 285

Leu Ile Glu Ser Leu Pro Glu Thr Ala Thr Asn Asn Asn Pro Ser Ile
290 295 300

Thr Ser Lys Gly Asn Ile Ser Leu Asp Trp Arg Leu Glu His Phe Lys
305 310 315 320

Lys Thr Asp Asn Leu Arg Leu Cys Asp Ser Pro Phe Arg Tyr Phe Ser
325 330 335

Cys Gly Asn Val Ala Phe Ser Lys Glu Trp Leu Asn Lys Val Gly Trp
340 345 350

Phe Asp Glu Glu Phe Asn His Trp Gly Gly Glu Asp Val Glu Phe Gly
355 360 365

Tyr Arg Leu Phe Ala Lys Gly Cys Phe Phe Arg Val Ile Asp Gly Gly
370 375 380

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Met Ala Tyr His Gln Glu Pro Pro Gly Lys Glu Asn Glu Thr Asp Arg
385                 390                 395                 400

Glu Ala Gly Lys Ser Ile Thr Leu Lys Ile Val Lys Glu Lys Val Pro
                405                 410                 415

Tyr Ile Tyr Arg Lys Leu Leu Pro Ile Glu Asp Ser His Ile His Arg
            420                 425                 430

Ile Pro Leu Val Ser Ile Tyr Ile Pro Ala Tyr Asn Cys Ala Asn Tyr
        435                 440                 445

Ile Gln Arg Cys Val Asp Ser Ala Leu Asn Gln Thr Val Val Asp Leu
    450                 455                 460

Glu Val Cys Ile Cys Asn Asp Gly Ser Thr Asp Asn Thr Leu Glu Val
465                 470                 475                 480

Ile Asn Lys Leu Tyr Gly Asn Asn Pro Arg Val Arg Ile Met Ser Lys
                485                 490                 495

Pro Asn Gly Gly Ile Ala Ser Ala Ser Asn Ala Ala Val Ser Phe Ala
            500                 505                 510

Lys Gly Tyr Tyr Ile Gly Gln Leu Asp Ser Asp Asp Tyr Leu Glu Pro
        515                 520                 525

Asp Ala Val Glu Leu Cys Leu Lys Glu Phe Leu Lys Asp Lys Thr Leu
    530                 535                 540

Ala Cys Val Tyr Thr Thr Asn Arg Asn Val Asn Pro Asp Gly Ser Leu
545                 550                 555                 560

Ile Ala Asn Gly Tyr Asn Trp Pro Glu Phe Ser Arg Glu Lys Leu Thr
                565                 570                 575

Thr Ala Met Ile Ala His His Phe Arg Met Phe Thr Ile Arg Ala Trp
            580                 585                 590

His Leu Thr Asp Gly Phe Asn Glu Asn Ile Glu Asn Ala Val Asp Tyr
        595                 600                 605

Asp Met Phe Leu Lys Leu Ser Glu Val Gly Lys Phe Lys His Leu Asn
    610                 615                 620

Lys Ile Cys Tyr Asn Arg Val Leu His Gly Asp Asn Thr Ser Ile Lys
625                 630                 635                 640
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Lys Leu Gly Ile Gln Lys Lys Asn His Phe Val Val Val Asn Gln Ser
645 650 655

Leu Asn Arg Gln Gly Ile Asn Tyr Tyr Asn Tyr Asp Lys Phe Asp Asp
660 665 670

Leu Asp Glu Ser Arg Lys Tyr Ile Phe Asn Lys Thr Ala Glu Tyr Gln
675 680 685

Glu Glu Met Asp Ile Leu Lys Asp Leu Lys Leu Ile Gln Asn Lys Asp
690 695 700

Ala
705